The Builder.

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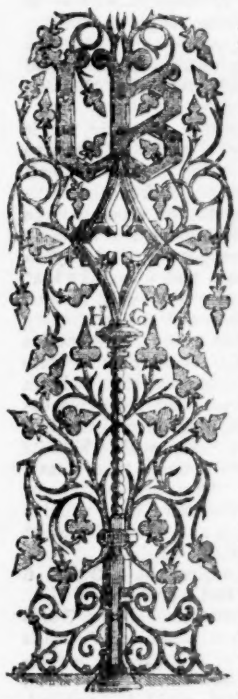
The Drainage of Brighton.



E are all interested in having Brighton properly drained and cared for,—in seeing that what Nature has made a healthy place is not spoilt by man. Brighton, with its three miles of houses fronting the sea, is not so far from London as Whitechapel is from Hammersmith: it is but the water-side of London, and there is no Londoner so poor but that, thanks to excursion trains, he may be all the worse for a mistake in sanitary matters made by the Brighton corporation. The town is getting into a bad state, as we have said before from personal knowledge; and those who are interested in the property there know that we spoke the truth, and frankly said so. They are at this moment turning their minds to the subject, and inquiring how they shall best drain the town; and they have obtained reports from Mr. Robert Rawlinson and Mr. Hawksley, and are now discussing which plan they shall adopt. Mr. Rawlinson has written them a very long and elaborate report,—indeed, so long, that it may probably damage his cause, and he starts with saying,—

"To render the town and district of Brighton unobjectionable to sea-bathers and promenaders, every existing sewage outlet must be removed from the shore, *and the entire volume of sewage must be conveyed to some point so distant from any houses, as not to be a cause of nuisance*, and the sewage must be so dealt with, and (if necessary) be so discharged into the sea, as to reduce any evil to a minimum. The entire town should be sewered, and every house should be drained. The sewers and drains should be so arranged and constructed as to insure a ready and free flow of sewage at all times. Accidental obstructions should be difficult, choking impossible, means of inspection and of cleansing easy, and ventilation constant and most abundant. All ventilating outlets should be placed where they will be least in the way, and the sewer gases should be made to pass through powerful and permanent, or easily removeable disinfectants, so as to prevent the possibility of contamination of the external atmosphere, or of the atmosphere within dwelling-houses. These principles are embodied in the plan and report now submitted."

Mr. Hawksley has contented himself with a very short report, and says:—

"After the fullest consideration of the subject, and whilst deeply impressed with the responsibility devolving upon me, I come to the deliberate and decided conclusion, that the *present outfalls are in regard to position not only well adapted to effect the outfall drainage*, but that if carried to a competent distance from the shore, and properly secured in their intended places, the existing causes of annoyance and complaint will cease to exist."

On this point we must rest. We care little for the other points raised in either report, but we unhesitatingly say, sooner than perpetuate the present outfalls, it will be much better that the Brighton Board should do nothing, and leave the matter to those who will come after and may have clearer eyes. The present outfalls are an abomination and a sin: they have done more harm than can be calculated; and to perpetuate them, though at a distance of 550 yards from the sea wall, by means of a cast-iron pipe, 30 inches in diameter, laid in a dredged trench, as Mr. Hawksley recommends, would be a suicidal act, but would not lead to a verdict of *felo de se*, because no jury of enlightened individuals would believe that it was done by men in their senses.

Mr. Rawlinson says,—

"Any system of sewerage in Brighton must have a general fall towards the sea; but there may be several ways of disposing of the refuse at the sea margin. At present the main outlet sewer is in the centre of the town, opposite the Steine; there are also outlets at Kemp Town and at Western-street, by means of sewer trunks and cast-iron pipes, discharging into the sea. Such outlets are, however, nuisances; and, although they may be improved, the nuisance would only be reduced, not removed. On the sea-shore opposite Hove and Brunswick-square there are five cast-iron pipe sewer outlets, and there is one such sewer outlet opposite Cliftonville and West Hove. These outlets do not reach low-water line, and are like those opposite to Brighton,—acknowledgedly great nuisances.

For the sewerage of Brighton and the adjoining districts there should be one outlet, and this should be placed as far from the inhabited shore as possible. All outlets for sewage should be removed from the sea fronting the town; there may, however, be storm-water outlets,—that is, outlets for heavy falls of rain,—so as to confine the dimensions of the sewers as much as possible within reasonable limits.

The new trunk outlet, now being restored, will answer at all times to remove storm waters flowing down the Pavilion valley, and will be so far useful.

The sewerage of Brighton might be taken east and west; but, unless the sewage is to remain a source of nuisance, there must be power to go beyond the existing municipal boundaries. The height of the cliffs to the eastward is so great an obstacle to pumping the sewerage inland for agricultural use that I have abandoned the idea of making a sewage outlet in this direction; and, as the proximity of Hove and Brunswick-square with Cliftonville and West Hove prevents any western outlet being formed on the western boundary of Brighton proper, I have proposed to carry the entire sewage of the district to the end of the canal connected with Shoreham harbour."

Before any water company had existence, all fresh water was obtained from springs, or was drawn from wells, and, without sewers and drains, surface cesspools were necessary to store the refuse for periodical removal. Since water has been partially supplied by a company, many wells have been turned into cesspools, and in other places deep cesspools have been sunk for the purpose of allowing the liquid out of the soil refuse to soak away. This is most injurious, as the subsoil rapidly becomes impregnated with refuse liable to putrify, and no mechanical filtration renders such fluid pure. Well water is therefore tainted by sewage infiltration, and no doubt is very injurious to health. There are many places throughout the town where well water is fouled by sewage, and much inconvenience is experienced by reason of foul smells from cesspools and from surface refuse. Proper sewers and drains are necessary to remedy such a state of things.

In Brighton large houses are more numerous in proportion to the population than in any other town in the kingdom, and the local rateable value of house-property is probably higher in proportion to population than in any other place. This is important when we come to consider the question of cost. Mr. Rawlinson's general proposition and estimate are thus put:—

"It is proposed to sewer the municipal borough of Brighton, Hove and Brunswick-square, and Cliftonville and West Hove, by one main line of intercepting sewer along the sea front from east to west. There will be, inland, a principal main along the Pavilion valley, and the sewage of the higher district in the west of the valley, and coloured pink on plan, will be intercepted from the lower level by sewers along Queen's-road and Western-road, so as to be turned into the main outlet sewer down Old Dyke-road, west of Cliftonville. There are to be 22,480 lineal yards of new brick sewers, from 6 feet diameter to 2 feet 3 inches by 1 foot 6 inches internal dimensions; and 53,896 lineal yards of earthenware pipe sewers, from 15 inches to 12 inches internal diameter; as also 2,010 lineal yards of cast-iron pipe sewers, from 3 feet to 1 foot 6 inches internal diameter. A total length of 78,386 lineal yards, or 44 miles and 956 lineal yards of new public sewers, 600 manholes and ventilating shafts, 600 lampholes, and 3,000 street gullies.

Land for sewage filtration, or for means of direct application, is provided for, as also 10 per cent. contingencies.

The estimated cost of the work for the entire municipal area of the borough of Brighton, and for outlet works and intercepting sewer, amounts to 123,000*l*."

The following may be taken as an analysis of

Mr. Rawlinson's Estimate.

Description of Sewers.	Length in Yards.		Price per Yard.	Amount.
Brick Sewers—				
Diameter.			£. s.	£. s.
6 ft.	4,850		3 10	16,975 0
4 ft. 6 in.	350		2 10	875 0
4 ft. 6 in. by 3 ft.	3,990		2 8	9,600 0
3 ft. 9 in. by 2 ft. 6 in.	1,890		2 2	3,969 0
3 ft. by 2 ft.	2,820		1 16	5,076 0
2 ft. 3 in. by 1 ft. 6 in.	8,580		0 18	7,722 0
Total brick sewers		22,480		
Earthenware Pipe Sewers:—			s. d.	
15 inches diameter	9,456		13 6	6,389 11
12 " "	44,430		10 0	22,215 0
Total earthenware pipe sewers		53,896		
Cast-iron Pipe Sewers:—			£. s.	
3 in. diameter	750		7 0	5,250 0
1 ft. 6 in. "	1,260		3 0	3,780 0
Total cast-iron pipe sewers		2,010		
Total length of sewers or 44 miles 956 yards.		78,386		
		Number		
Man-holes and ventilating shafts		600	20 0	12,000 0
Lamp-holes		600	4 0	2,400 0
Gullies		3,000	3 10	10,500 0
Outlet works, overflows, and extra work on steep gradients, &c.				5,000 0
Contingencies, including repairs, &c. of existing sewers, 10 per cent.				11,178 9
Total				122,930 0

This sounds a large sum. Let us look at what Mr. Hawksley puts the cost of his scheme at. He says:—

"As nearly as I can ascertain from the plans furnished to me, it appears that a complete system of drainage will require very nearly 70,000 yards in length of new sewers of various sizes, from a minimum of 2 feet diameter (egg-shaped), to a maximum of 5 feet diameter (cylindrical), and I estimate the expense of constructing the same, including the proposed outfalls, at the sum of 57,000*l*."

Surely there must be some error here. 70,000 lineal yards of sewers of various sizes, from 5 feet diameter (cylindrical) to 2 feet diameter (egg-shaped) with the necessary outfalls, and all for 57,000*l*. If we were Brighton we would not adopt the scheme, even if the difference were as stated, but we have little hesitation in saying, with all proper respect for Mr. Hawksley, that he must have fallen into some error.

Here is an approximate estimate, at the same prices as in the other case, of

Mr. Hawksley's Plan.

Assumed Description of Sewers.	Assumed Length in Yards.		Price per Yard.	Amount.
Brick Sewers:—			£. s.	£. s.
5 ft. diameter	4,000		3 0	12,000 0
4 ft. do.	4,000		2 8	9,600 0
3 ft. do.	20,000		2 2	42,000 0
2 ft. (egg-shaped) do.	42,000		1 0	42,000 0
Total length of brick sewers		70,000		
Cast-iron Outlet Pipes:				
3 ft. diameter	550		7 0	3,750 0
2 ft. do.	1,100		6 0	6,600 0
Total length of cast-iron pipes		1,650		
Total length of sewers.. or 40 miles 1,250 yards		71,650		
Side entrances, manholes, and ventilating shafts, say		Number 540	20 0	10,800 0
Gullies		3,000	3 10	10,500 0
Contingencies, including repairs, &c. of existing sewers, 10 per cent				13,750 0
Total				151,000 0

This has been made out for us by one adverse to the scheme, and the lengths assumed of large sewers may be wrong. We do not feel ourselves to be in a position to adopt it unreservedly, but it certainly satisfies us that Mr. Hawksley's own estimate must be greatly under the mark.

As to the application of the sewage to agricultural purposes, Mr. Rawlinson admits its value, points out the difficulties which at present beset the question, but prepares, when the right time comes (and we will add, the right man), for its use. He says :—

"I have personally examined most of the places in Great Britain where sewage is applied to land direct, as also the places where sewage disinfecting works have been established. Such examination has shown that the only chance of pecuniary benefit lies in dealing with sewage in its liquid form. Any solid material hitherto obtained from sewage by filtration or by precipitation, is not worth the cost of the labour and materials used.

The fluid sewage of Brighton will be chemically worth applying to the land for agricultural uses, should the district be fully sewered and drained, and the use of water-closets become general."

Mr. Hawksley, on the same subject, says :—

"I am unable to recommend the corporation of Brighton to make any endeavour to utilize the sewage flowing from their town, unless in the course of the progress of science some discovery should hereafter be made, resulting in advantages of which we have no present knowledge."

The point we adhere to, however, is the outfall. As we have already said, every one is interested in the salubrity, pleasantness, and prosperity of Brighton, and in their interest as well as in that of the inhabitants of the place, we express our unhesitating conviction that the retention of the present outfalls would be most unwise and injurious, and would lead to wasteful expenditure hereafter, in a perhaps vain endeavour to remedy the error.

GLEANINGS FROM WESTMINSTER ABBEY.*

I have given my paper this title with the intention of expressing that it is intended in no degree as an historical, architectural, or antiquarian treatise on this magnificent building, but simply as a casual notice of objects or of subjects connected with it, which have occurred to me as being less known or less noticed generally than they deserve to be. I had long ago thought of writing such a paper, but during the interval my intention has been in a great degree forestalled both by my having had occasion myself, at several times, to call attention to many of the points I have now to notice; and further, by the interesting discussion introduced some years back at this Institute by Professor Donaldson, on the subject of the shrine of Edward the Confessor. Now that I have been induced to resume my first intention it has happened that my time and thoughts have been necessarily so much occupied by other matters, that I have found it quite impracticable to do any kind of justice to my subject; so much so, that I should have "backed out" again had your zealous honorary secretary have permitted; but as he is inexorable, I must e'en beg you to excuse the crudeness and the want of method and, with some exceptions, the want of novelty of what I have to lay before you.

Though I use the word "gleanings" I do not mean to imply that the harvest is over; on the contrary, the antiquarian and documentary part of the subject is, I am convinced, not only unexhausted, but scarcely entered upon: we really know next to nothing of the actual history of this the most nationally interesting of English churches. The information given us in the published histories is meagre in the extreme, while the public records and the archives preserved in the church seem as yet to have been only very partially searched for information as to its structural history. I earnestly wish that some of our learned antiquaries would take this interesting task in hand. It needs long and laborious research, but I feel sure that the labour would be richly rewarded.

I will here add that, since I wrote the foregoing sentence, much has been done towards this object by my friend Mr. Burtt, of the Record Office, which I shall have to notice hereafter.

* Read by Mr. G. G. Scott at the Institute of Architects, as elsewhere mentioned.

All we know of the earliest history of the fabric is that there existed a church here in the days of King Offa, and that this (or a successor of it) was rebuilt, and the abbey refounded, by Edward the Confessor. One of the first thoughts which occurs to us in considering the history of our abbey is, then, the question as to what kind of church was that which preceded the present structure, and which we know to have been erected by this sainted monarch. As, for example, what was its size and form? Was it on the small scale which appears to have been common among Saxon buildings, or of the gigantic dimensions adopted by the Normans? And, again, was its architecture more on the Saxon or on the Norman type?

William of Malmesbury, writing in the following century, speaks of it as "that church which he, the first in England, had erected in that mode of composition which now nearly all emulate in its costly expenditure;" or, in other words, it was the earliest Norman church.

Matthew Paris, in the thirteenth century, merely adapts the same statement to his own times, saying that the Confessor "was buried in the church which he had constructed in that mode of composition from which many of those afterwards constructing churches, taking example, had emulated in its costly expenditure;" evidently considering its style the same as that of the Norman churches with which he was surrounded.

Sir Christopher Wren gives us, as he says from an ancient manuscript, the following particulars:—"The principal area or nave of the church, being raised high and vaulted with square and uniform ribs, is turned circular to the east; this on each side is strongly fortified with a double vaulting of the aisles in two stories, with their pillars and arches: the cross building contrived to contain the choir in the middle, and, the better to support the lofty tower, rose with a plainer and lower vaulting, which tower, then spreading with artificial winding stairs, was continued with plain walls to its timber roof, which was well covered with lead."

From the above one would by no means infer that the church was of small dimensions, and I am very much disposed to think that it may have been nearly, or quite, as large in its elementary scale as the present structure. Edward the Confessor having spent so much of his early life in Normandy, it is unlikely that he should be content with the dimensions of a Saxon church; indeed, had he been so, he had one to his hand without building a new one; and as he was greatly enlarging the monastic establishment, it seems probable that in rebuilding the abbey church he would adopt the scale which was becoming common in Normandy. Harold, we have every reason to believe, did the same in building his church at Waltham; for whatever may be the merits of the disputed question as to whether any part of his work yet remains, there can be no doubt that his choir, at least for a time, coexisted with the present nave, and agreed with it in elementary scale. Again, we have no reason to believe that the choir of Westminster Abbey was rebuilt between the days of Edward the Confessor and those of Henry III., which would have been inevitably the case had its scale been diminutive; and, if it did exist through that interval, we have full proof that it was as long as the present eastern arm of the church; for the present position of the transept we know to be identical with that of the Confessor's church, from the fact of the remains of his dormitory abutting against it in the usual manner; while the eastward extent of the old church is defined almost with certainty by the fact that the Lady Chapel was erected against it in the early days of Henry III. some years before he commenced rebuilding the church itself. The dimensions of the ancient nave are less easy of conjecture. The width, I think it probable, would have agreed with the existing one; and if the Confessor adopted, as I imagine, the usual scale of the great churches of the Normans, there is no reason to suppose it to have been much shorter than at present,—an opinion which is to a certain extent corroborated by the size of the cloister court, the north and east sides of which would have been defined by the external walls of the nave and the dormitory; and its southern limits by the refectory, in which there exist early remnants sufficient to show that it occupies its original site. The completion of the square thus marked out carries us to within three bays of the western towers; and as cloisters rarely reached the end of a nave, it leaves it as a probable inference that the old nave did fall far short of the length of that now existing.

At St. Alban's and Winchester, which were erected within the same century, the elementary scale, or width from centre to centre of the piers, is about the same, the length of nave considerably in excess, and the original length of the Norman choir also greater. The structural choir, or eastern arm, at Westminster, is, in fact, so short, as to preclude the idea of its having been rebuilt during the later Norman period, being less than that of many early Norman choirs.

We now come, however, to surer ground. I mean the portions of the Confessor's work which still exist. These consist of the substructure of the dormitory, forming a long range of building running southwards from, and in a line with, the south transept, and passing under the library and the great school-room which now occupy the position of the ancient dormitory.

The substructure is vaulted in two spans, and is divided longitudinally by a range of massive round columns, the whole being seven and a-half bays, or about 110 feet in length from the vestibule of the chapter-house to the cross passage now leading into the little cloister, and formerly to the infirmary. This range was, probably, in the first instance, continuous and open, like that at Fountains Abbey, but was very early divided into separate compartments, as I shall presently show. It is so seldom that we find constructive columns remaining in this country of a date earlier than the Norman Conquest, that it is an object of some interest to see what form they exhibit, though I admit that, date alone excepted, this can hardly be called a Saxon work, whilst its unimportant purpose forbids us to take it as a fair example of any style. There are only one or two of these columns which retain their pristine form, the others having been altered at subsequent periods.

These consist of a cylindrical shaft, 3 feet 6 inches in diameter, and 3 feet 4 or 5 inches high. The capitals have a vast unmoulded abacus, 7 or 8 inches deep, supported by a moulding, if such it may be called, consisting of nothing but a frustum of an inverted cone, the most pristine form, almost, to which a capital could be reduced, thoroughly efficient, but with the least possible amount of workmanship, not unlike what we may imagine may have been the first type of the Doric capital, and but one step removed from its apparent prototype among the tombs at Beni Hassan.

We must not, however, for a moment suppose that this rudely pristine form was that usual at the period, except in rough and unimportant situations. We know that in the contemporary work at Waltham, the capitals were enriched with ornaments of brass, and that much earlier Saxon columns had enriched capitals. We must simply view it as a specimen of the honest simplicity with which they treated the less important portions of their structures. It is, in fact, only one step more plain than the capitals in the crypt at Winchester, which was constructed some twenty years later. The bases very closely resembled the capitals, but have, like them, generally been altered from their original form.

These columns carried plain groining, with square transverse ribs, partly constructed of tufa.

It is somewhat curious and interesting that, during the Norman period, the majority of the capitals have been altered and enriched in various ways. Being within reach, their massive plainness seems to have tempted the monks to try experiments upon them, and we accordingly find the original block cut into a great variety of forms, some of them of considerable richness. The state of the capitals shows that the building was already subdivided, as the alterations are often totally different on the two sides of the capital, leaving a narrow intervening frustum of the original, representing the thickness of the partition. Some are roughly chopped into a form, preparatory to the enriching process, which has not been completed.

The accompanying sketches show some of the altered forms which the capitals assume. The bases were also altered, and, in some instances at least, the floor so much lowered that the lower part of the columns had to be cased with new stone.

The first bay of this early work adjoins the outer vestibule of the chapter-house, and is imperfect, having been shortened by the later buildings which here abut against it. The capital of the column here visible is entirely altered to a round and slightly enriched form.

Next to this comes the celebrated chapel of the Pyx. This, as is well known, has long been held by the Government. It formally, I believe, contained the records of the Treasury, but now contains only empty cases and chests, with one exception, in which the paraphernalia for the trial of the Pyx are contained. I have recently,

through the kindness of the Chancellor of the Exchequer and the Secretary to the Treasury, visited, for the first time, its mysterious recesses: a formidable visit, requiring the presence of representatives of the Treasury and the Exchequer, with their attendants, bearing boxes which contain six mighty keys.

It occupies two bays of the Confessor's work, a detached column standing in the centre. This column bears marks of a partition having at one time abutted against it, on one side of which the capital has been made round and slightly enriched, while on the other it has undergone no alteration but the rough canting off of its angles as if preparatory to further alteration. The column which is partly built up in the north wall is on this side altered exactly as on the other, where it is seen in the adjoining chamber, showing that there was there no partition against it. That on the south side I was not able to examine, owing to the presses by which it is concealed. The portion of it which is visible on the other side of the wall is one of those in which I have found the capital unaltered, and I was curious to see if the opposite side was so too; but was disappointed. In one of the eastern bays of the chapel the stone altar remains nearly entire. It is perfectly plain, and has in the middle of its top a large circular sinking, apparently for the reception of a portative altar-stone; though the form is, I believe, unusual. Adjoining the altar is a detached piscina, in the form of a column. It appears to be of the thirteenth century. The windows, which are very small, and probably of the same date, are doubly and very closely grated, and well they might be so, for we learn that during the reign of Edward I. the king's treasury here was robbed of 100,000*l.* which he had laid up here for the Scotch wars, for which the abbot and forty monks were sent to the Tower on suspicion. I fancy that the chamber was brought to its present form and its security increased after that event. Of the contents of the Pyx Chapel I will speak presently. The bays of the early work beyond the cross passage to the little cloister are simply waggon-vaulted,* as is that passage itself, as well as that which is called the Dark Cloister, which I suppose to be of the same age. Of the walls of the Dormitory† itself considerable portions remain. Several of its walled-up windows are visible in the great school, and the exterior of one remains little altered excepting by decay. It has a shaft in each jamb, and is like Early Norman windows.

The only other part which is at all likely to belong to the Confessor's buildings is a part of the south wall of the Refectory, in which a round-arched wall-arcading is still to be traced. As the Confessor increased the number of monks to seventy, he would want *eating* as well as *sleeping* room in due proportion, and in the absence of opposing evidence it is likely enough that this may be a portion of his refectory.

The next building which I will notice is the chapel of St. Catherine, a work of the succeeding century. It was the chapel of the Infirmary, and occupies a position not dissimilar to the corresponding chapels at Canterbury, Ely, and Peterborough.

The usual form of infirmary of a monastery was very similar to that of a church, with this simple difference, that the quasi-nave was very long, and was divided at about one-third of its length from the east, by a cross wall perforated only by a central doorway; the western portion forming the infirmary proper, the eastern portion being the nave of the chapel, and a chancel extending still to the eastward.

This arrangement allowed the sick monks to hear the services as they lay in their beds, while the convalescent could readily transfer themselves to the chapel. This may still be traced out at Canterbury, Ely, and Peterborough; and there is a nearly similar building still in use (though unconnected with the cathedral) at Chichester; as also (with more or less variation) at Bruges, at Lubeck, and, I dare say, many other places. Now, I imagine it is possible that the Westminster Infirmary may originally have been of the same description. The chapel, of which the remains are sufficient to show its plan, agrees with it precisely; but the infirmary proper is gone, and may, I fancy, have been destroyed when the small cloister was built. If so, it, no doubt, extended westward to the wall in the Dormitory. This, however, is a mere suggestion, and would be disproved if the small cloister can be proved to be of early date, which I see that Widmore imagines it to be. In that case, I should suppose that the Infirmary surrounded it.

I have recently discovered an old hall of the date of Abbot Litlington, who is known to have built a new house for the Infirmarer. It abuts upon the south side of St. Catherine's Chapel, and has a doorway into the chapel. It was, no doubt, the hall of the Infirmarer's house, and was probably used by the convalescent patients. The garden, now called the College Garden, was originally the Infirmary garden.

The chapel consisted of a nave and aisles, of five bays long, with a chancel of which I cannot ascertain the length. It is of very good Late Norman, and in its details much resembles that at Ely, even to the setting of the octagonal columns, angle foremost, but it is less rich.

The west doorway is of Abbot Litlington's time (temp. Edward III. and Richard II.). I exhibit sketches of the leading parts of the chapel. The pier of the chancel arch was discovered last year while making alterations in an adjoining building, but was unfortunately destroyed before I could see it.

The hall I have mentioned had a gallery extending over the aisle of the chapel, with a fireplace in it.

I have been able to preserve and expose to view the hall with the exception of this gallery, which I was unable to save, though its fireplace still exists. The parts of the chapel which were formerly enclosed in the adjoining building, are now exposed to view.

The only other Norman remains that I am aware of are some rather rich fragments, found under the nave floor, when the new stalls were being erected in 1848. I see that in the time of Henry II. or thereabout, stalls are mentioned as being made for the "new work." This looks as if the western part (which contained the stalls), had been rebuilt; but I am inclined to think that the new work was the Chapel of St. Catherine just built, the altar of which is said to have ranked second among them all.

I must apologise for dwelling so much at length on these early features. I have done so because they are generally but little known.

I now come to the existing church, a building which does not owe its claims upon our study to its antiquarian and historical associations; intensely interesting though these must be to every man worthy of the name of an Englishman. It has claims upon us architects,—I will not say of a *higher* but of *another* character, on the ground of its intrinsic and superlative merits, as a work of art of the highest and noblest order; for, though it is by no means pre-eminent in general scale, in height, or in richness of sculpture, there are few churches in this or any other country, having the same exquisite charms of proportion and artistic beauty which this church possesses. A beauty which never tires, and which impresses itself afresh upon the eye and the mind, however frequently you view it, and however glorious the edifices which, during the intervals, you may have seen; and, I may add, which rides so triumphantly over the dishonour which, under the name, for the most part falsely assumed, of *high art* more modern ages have ruthlessly heaped upon it.

The period of the erection of Westminster Abbey was one of the great transitional epochs of our architecture. During the latter half of the twelfth century the Romanesque, or Round-arched Gothic, had, both in France and England, transformed itself by a thoroughly consecutive and logical series of changes into the pointed arched style, and in both countries that style had been worked into a state of perfect consistency, and in each it had assumed its national characteristics, so that the works in the choir at Lincoln, the Lady Chapel at Winchester, and the western portals of St. Alban's and Ely, all of which date from 1195 to 1215, mark the perfectly-developed Early English style, and are readily distinguishable from the contemporary works in France.

The English works of this period have, at least to our eye, a more advanced appearance than the French. The round form of the abacus, the greater richness and delicacy of the mouldings, and generally a more decided severance from the massiveness of the Romanesque forms, give to the works I have alluded to a later appearance than what we observe in buildings of the same precise period in France. The leading characteristics were, however, much the same. The windows especially, in both countries, consisted, for the most part, of individual lights, placed either singly or in groups. The chief variety from this was when, as was usual in the triforium openings and in belfries, two or more such lights were placed under a comprising arch, the interval below which was very usually pierced with circular or other openings. This was not, chronologically speaking, a step in advance of the detached light, but had all along been its contemporary, whether in the Romanesque, the transitional, or Early Pointed styles, and both were equally in use in France and England. In domestic work, the last-named type (that with two or more lights under a comprising arch) was always prevalent, on account of the smallness of the intermediate divisions, which, from an early period, it was customary to reduce to a thin shaft of marble or plain stone, as we see in our own country, even in Romanesque works, as at the Jews' House and the building commonly called "John of Gaunt's Stables" at Lincoln, Fountains Abbey, Richmond Castle, &c. As a general rule, however, the more detached form was, for a long time, the prevalent form in churches, both in France and England. The difference between the course pursued in the two countries was this: that, while in England the special energies of the builders were directed to the perfecting of the more usual type, the French began early in the thirteenth century to show a preference for the other, and rather to neglect the perfecting of the more typical form. Both forms were frequent in each country, but the efforts of the English were rather directed to the one, and of the French to the other. The consequence was that, while in England the grouping of distinct lights was being brought to the utmost perfection, the French were engaged, more especially at least, on a number of tentative steps towards what became afterwards the mullioned and traceried window. I will not attempt a history of this invention, but will just call attention to one or two of its steps. At Bourges we have the earlier type in its full perfection, the spaces between the comprising and comprised arches and the piercings of the head being a flat face. At Le Mans and Tours we find these spaces cut out parallel to the lines of the openings, not, however, moulded into what is called *bar* tracery, but as if sawn square through,—a very clumsy and crude contrivance, very inferior to the plate tracery it was intended to improve. At Rheims, so far as I know, is seen the earliest introduction of the perfected principle. We find there, for the first time, as I believe, the pierced spandrils and gussets moulded as the openings themselves, and the principle of bar tracery completed, though with some remaining imperfections. It is very difficult to fix dates to these transitions. Rheims cathedral was commenced in 1212, and it is generally supposed that the first architect, De Coucy, completed the aisles in 1220 or 1225. M. Viollet le Duc, naturally enough, seems puzzled at finding perfect traceried windows at so early a period, and suggests it as probable, as the transept of the same work does not exhibit equal advancement, that the aisle windows were altered by him a little later. Certain it is that neither Bourges nor Chartres, which were built about the same time, give any evidence of a like progression; while the intermediate step at Le Mans and Tours would appear, from many of its accompanying details, to be of later date than that given to Rheims. Had Villars de Honnecourt put a date to his sketch-book, which gives these very windows at Rheims, the difficulty would perhaps have been solved.

The windows, with similar tracery in Notre Dame at Paris, M. Viollet le Duc, from internal evidence, dates from 1235 to 1240. The Cathedral at Amiens presents difficulties as to date almost equal to that at Rheims, but, in the whole, we may fairly suppose this development to have become pretty common in northern France by about 1230 or 1235, though not to the extent of superseding either the detached light or the plate tracery. Pierre de Montereau, the architect to Sainte Chapelle in which the perfected tracery prevails, built also the refectory of St. Martin aux Champs, in which it does not appear at all.

During the same period the peculiar, and afterwards stereotyped, French arrangement of the Chevet, or the Apse with its group of radiating chapels, had been brought, by many steps, to its final development.

Radiating chapels, growing out of the main apse or its aisles, had been early used. In this country we find them at Gloucester and Tewkesbury, and in the foundations recently excavated at Leominster, all of the Romanesque period; and later we find them at Pershore. The French characteristic, however, was the arranging of them in polygons fitting to one another and to the sides of the polygonal aisle of the main apse,—a sort of corona of little chapels mathematically

* These waggon-vaults are formed of tufa laid in rubble-work, and still showing the impressions of the boards of the centering on the mortar.

† The Dormitory was partially burnt in 1416.

fitted together and their axes radiating to the centre of the apse, at or near which the high altar was usually placed. This we find in many tentative forms, but the system appears to have been brought to perfection at Rheims and Amiens,—the latter of which churches appears to have henceforth been taken as the type, on which, in the majority of cases, though subject to some varieties, the grouping of Eastern chapels was founded, as at Beauvais, Cologne, Altenberg, and a host of other instances. The two German apses last named, I may mention, however, seem to have had Beauvais rather than Amiens for their immediate type.

There can be little doubt that King Henry III. during his sojourns in France, became enamoured of this arrangement, which, in its perfected form, he may have seen in course of being carried out at Amiens, Beauvais, Rheims, and elsewhere. It would naturally strike him as well suited to the reconstruction of the eastern portion of a church, already possessing an apse with a continuous surrounding aisle. Whether this project had been formed when the Lady Chapel was built in 1220, it is impossible to ascertain. This was begun in the same year with Amiens Cathedral, and eight years later than Rheims; so that it is not impossible, though the extreme youth of the king would in that case compel us to transfer the originating of the scheme from him to the abbot. However this may be, it is probable that it fell readily into the subsequently adopted plan, as we find no disturbance of the regularity of the division which would otherwise have been the case.

Judging from internal evidence, which is all we have to go upon till the public documents and the archives of the Abbey are more thoroughly searched, I should imagine that an English architect, or master of the works, was commissioned to visit the great cathedrals then in progress of erection in France, with the view of making his design on the general idea suggested by them. Would that, like his contemporary Villars de Honnecourt, he had bequeathed to us his sketch-book!

The result is precisely what might have been expected from such a course. Had a French architect been sent for, we should have had a plan really like some French cathedral, and it would have been carried out, as was the case with William of Sens' work at Canterbury, with French details. As it is, however, the plan, though founded on that common in France, differs greatly from any existing church, and it contains no French detail whatever, excepting the work of apparently one carver. I have sometimes fancied that I could detect a French moulding in the water-tabling of the external buttresses, but these are themselves restorations, and are so decayed that I cannot make sure of their section. If it be so, it is just one of those exceptions which prove a rule.

The architect, however, in imitating the great contemporary churches in France did adopt another of their great characteristics,—the bar tracery of their windows. I am not aware that it exists in a perfected form in any earlier English work, though often closely approached. It is said that Netley Abbey was erected about 1240, and the Eastern part of old St. Paul's is said to have been consecrated in that year; and as both of these contained perfected tracery, the substantiation of those dates would establish for us an earlier claim; but, on the whole, I think we may fairly yield this development to our neighbours, and consider this to be about the period at which we borrowed it, though so perfect is the catena of transitional steps that, had it not been from external evidence, we should have had no difficulty in tracing out the history of the development from English examples; the only step which I miss in them being that which I have given from Le Mans and Tours, on which, however, I have never heard any stress laid.

This church is, then, remarkable as marking, first, the introduction of the French arrangement of chapels which, however, failed to take root here; and, secondly, the completed type of bar tracery, which was no sooner grafted on an English stock than it began to shoot forth in most vigorous and luxuriant growth.

Though the French type was, as a general form, adopted in planning the chevet with its circlet of chapels, I know of no French church from which the actual plan could have been taken.

The simplest mode of setting out the chevet with its chapels, is that adopted at Rheims, which is effected by simply describing a semi-circle upon the transverse line passing through the easternmost of the main range of columns, and of a diameter equal to the width from centre to centre of those columns, and inscribing in it a semi-decagon, whose angles will give the centres of the piers, the same operation being repeated for those of the aisles.

At Amiens the system is different, the two semicircles are described; one for the piers, and the other for the aisle; and about each of these it would seem that the normal idea was that a portion of a dodecagon should be circumscribed; but in fact the sides are a little less than those of that figure.

On the outer circuit of the aisle, seven angles of the quasi-dodecagon represent the centres of the piers between the radiating chapels, while on the inner circuit, five angles of the smaller quasi-dodecagon represent the centres of five of the piers of the apse; the two remaining piers being placed at the points where the transverse line which cuts off the seven sides of the outer apse, intersects with the longitudinal lines which pass through the centres of the main ranges of piers.

It will be seen that this gives a bay of a width intermediate between those of the apse and those of the main arcade, but in a line with the latter. The chapels are alike in the width of their arches, but differ in the westernmost sides of the western chapels, not radiating in a regular manner.

The Chevets at Beauvais and Cologne differ from that at Amiens in this, that the dodecagons are *in*scribed instead of *circum*scribed. It follows that only five of the angles of each dodecagon represent the angles of the outer or inner apse; the remaining angles of the former are found by spreading the figure outwards, till it intersects with the line of the wall; and those of the latter, by drawing a transverse line from these points to its intersection with the longitudinal lines of the main range of columns as before. The consequence is, that the first side of the apse has a slight inclination instead of being parallel to the axis of the church.*

The chevet at Westminster differs greatly from any of the above. The sides of the apse are five in number, as at Rheims, but instead of being five sides of a decagon, the three easternmost are sides of an octagon, and the others incline but slightly from the sides of the church. The great peculiarity, however, is in the chapels, which occupy so much more than the semi-circle as to do away with one of the non-radiating chapels, reducing the space it usually occupies to an irregular pier, and introducing opposite to it in the aisle a bay, of very irregular form. I had long noticed this peculiarity, though I had thought it an irregular contrivance, to give greater size to the apsidal chapels; but from finding the setting out of the work remarkably exact, I was led to think that some mathematical principle must have been acted on, and having had most careful measurements made and tested in every way, I find this to have been the case.

The system is this: the two semi-circles are drawn as before, the diameter of the inner one being the width from centre to centre of columns. A semi-octagon is inscribed in this; three of its angles give the centres of the piers of the outer and inner apses, the remaining sides of each apse being formed by spreading them till they meet the main longitudinal lines. It most resembles the principle followed at Beauvais, but differs from it (besides the smaller number of the sides), in the outer and inner apse being exactly alike in principle, and all their sides equal, and both set out in regular radiating lines, instead of using the transverse line adopted at Beauvais. This system has great advantages; it avoids the narrowness of the apsidal bays so apparent in most of the French examples; it gives a beautiful gentleness of transition from the main arcades into the apse, and it also gives a great boldness and expanse to the chapels,—advantages purchased cheaply at the expense of one of the square chapels on either side, and a certain degree of picturesque irregularity in the aisles. It should be mentioned that the setting out of this church is remarkable for its regularity and exactness, though the drawing of an intricate methematical figure on the ground, some 120 feet wide, necessitated some trifling deviations from absolute precision.

The section of the church also differs much from that of the great contemporary buildings in France.

The earlier French Pointed churches had retained the Romanesque system of having, not a mere triforium, but a distinct upper story over the aisles, often with a second range of vaulting. The same occurs (though not vaulted) in many of our own Early Pointed churches, especially where they resulted from the piecemeal reconstruction of their Norman predecessors. At Amiens and Rheims as at Salisbury, Whitby, Rievaulx, and indeed the majority of our churches of the thirteenth century, this second story was represented only by the space intervening between the roof and vaulting of the aisles. At Westminster, however, for some special reasons, the second story, which we know to have existed in the Confessor's church, was continued in its successor, probably to admit more numerous spectators on grand occasions, such as coronations and royal funerals. It was obtained not so much by increasing the height of the triforium arcade as by flattening the aisle roof so as to allow of a wall of considerable height to the triforium, the story being lighted by short windows of a quasi-triangular form filled in with cusped circles.

The spaciousness of this upper story is quite surprising to those who see it for the first time. It is capable of containing thousands of persons, and its architectural and artistic effects as viewed from different points are wonderfully varied and beautiful.

I have sometimes doubted whether, however, this arrangement was contemplated when the building was commenced. There is about the intersection of the aisle roof with the flying buttresses a want of system which does not seem of a piece with the studious exactness of other points of the design, but is more like the result of an alteration of the design during its execution. It gives also to the transept elevation a high-shouldered look, which is detrimental to its elegance, and, while it adds to the external importance of the aisles, it rather takes from the dignity of the clerestory by concealing its natural spring from behind the abutting roof of the aisles.

I may mention that the very same arrangement was followed in the contemporary work in the north transept at Hereford; indeed, the very cuspings of the circular windows which I have recently discovered there seem to be exactly copied from those in the same position at Westminster.

Of the mathematical proportions on which the design of the church has been founded it is hardly safe to speak. This is a subject on which so much uncertainty, and consequent difference of opinion exists, that it would be unwise to be dogmatic, or to adopt any theory too positively. The proportions are, however, so pre-eminently satisfactory to the eye that it is not unprofitable to examine into them; for, whether the result of accident or intention, the lessons to be learned are the same: indeed, it is perhaps almost more instructive to find that proportions arrived at by tentative experiments and a correct eye coincide with some mathematical principle, than, after trying many geometrical formulæ, to find one which gives a result satisfactory to the eye. That beauty of proportion may be reduced to mathematical principles I have no doubt, but as mathematical forms are of infinite variety, and of very unequal beauty, while the reasons why one is more pleasing to the eye than another are, to say the least, very occult, it seems to follow that the laws of proportion must be investigated by a process partly tentative and partly geometrical; the proportions dictated by the eye and those resulting from mathematical forms being mutually tested the one by the other, till we are able to determine which set of geometrical proportions is most beautiful, and which among the forms which please the eye are capable of being reduced to mathematical proportions.

As an illustration of this, I remember, many years since, while looking at a plate in "Britton's Antiquities," in which he gives internal arches from a number of our cathedrals, I set myself the task of determining which were the most beautiful in their proportions. To my surprise I was compelled to choose the two which apparently most differed the one from the other, in fact the tallest and the shortest of the set. I was perplexed at so contradictory a result, but, as I could not go against the dictates of my eye, I endeavoured to investigate the cause, and had much pleasure in finding that both (as shown in the drawing at least) might be resolved into equilateral triangles, the Westminster arch having three, and that from Wells only two of them in its height. I have somewhere heard that in an old work of the Freemasons it is said that good proportions may be obtained from the square, but better from the equilateral triangle, and I have little doubt that t is true.

If the principle of the triangle is applied in the present case, the main section may be said to have a height of three equilateral triangles described

* These definitions are open to some modifications for irregularities admitted in the setting out.

upon the transverse width of the church from centre to centre of the columns, which dimension seems in all churches to have been taken as the elementary scale on which the proportions were founded. Another proportion common in old works is derived from the diagonal of the square of this measure. Both have been claimed as the system made use of at Westminster; but the more closely one examines into it, the more clear it is that the equilateral triangle is the figure actually made use of. I have made careful measurements and find it fully established that this is the case. I find that the elementary width is about 5 inches greater in the transept than in the choir and nave. Possibly it had been affected in the latter case, as it would appear to have been in the aisles, by some particular cause, for the difference is clearly not accidental, being most systematically carried out and adhered to throughout to a fraction. If we take the larger of these dimensions it will be found to agree very closely indeed with the different parts of the church. The height of the nave exceeds the three triangles only by about 8 inches. The height to the triforium string course exceeds half that dimension, or the three triangles of the semi-scale, by only 4 inches; and the height of the triforium itself is 4 inches in excess of one of these minor triangles: differences so small as to be invisible in so great a height. This agrees with the theory laid down by Professor Cockerell, in his excellent paper published by the Archeological Institute in their Winchester volume. He defines it in this way: that if you assume double aisles to the nave (*i. e.* if you triple the elementary width), the equilateral triangle described on this width will give the height of the vaulting. In the ichnography the proportions are far less exact. The idea would appear to be that the length of the church should consist of four, and the length of the transept of two of the heights of the great triangle last named. This is however by no means exact, and one cannot lay much stress upon it.*

I may here mention that the same system holds good in the Chapter-house, of which the height agrees with that of an equilateral triangle described on its diagonal, or, more properly, each of its arches from the central pillar to the angle-shaft has the height of two triangles, or of a regular vesica piscis.

The details of the internal design greatly exceed in richness those of French works of the same age, excepting only in the extent to which the capitals are foliated.

The arch mouldings are peculiarly beautiful. The triforium arcade is as beautiful as any which can perhaps be found. That to the eastern part of Lincoln may be almost richer, but its proportions yield in beauty to those of Westminster. The richness of the whole is also vastly increased by the wall-surfaces between the arches being enriched with a square diaper. The wall-arcading is of exquisite design, and the spaces over it were filled with most beautiful foliage with figures interspersed, while the spandrils of the cusping were filled with ornamental painting. When, to the richness of architectural detail, we add that of material—the entire columns and all the subordinate shafts being of marble, and the remainder of stone of several different shades of colour,—the magnificence of the internal design must have greatly exceeded that of its French prototypes. The only one point which strikes the eye as looking less rich is the use of merely moulded capitals to the main pillars. This, however, arose from their being of Purbeck marble. It is true that at Ely and elsewhere, as in our own Chapter-house, the carved capitals are of this stubborn material; but its use may, nevertheless, be accepted as a fair excuse for moderating the workmanship. The internal designs of the transept ends are truly magnificent; indeed, I doubt whether their equals can be found elsewhere. The manner in which they continue the lines of the general design, and yet add diversity to the forms, is truly artistic.

It is most unfortunate that the great rose windows have lost their original character. I have, however, a strong impression that the old ones may have, in their leading subdivision, resembled that now existing in the south transept, and that the design has been simply translated from that of the thirteenth to that of the fifteenth century. I have attempted in the accompanying drawing to translate it back again; and you will see that it makes a very fine window, in perfect accordance with the character of the church, and very much like several existing specimens. You may say that this is pure conjecture,—and so it is: but it is a conjecture not devoid of some collateral corroboration; for, singularly enough, there exist in the Chapter-house some encaustic tiles of a pattern evidently copied from a rose window, and agreeing precisely in its divisions with that under consideration, representing even the shafts with their caps and bases. It will be seen that my translation of the existing window into Early English almost precisely resembles the pattern given on those tiles. The square form in which the circle is inscribed seems to be original, from the systematic way in which the vaulting is accommodated to it; but it must be admitted, on the other hand, that there are, in the eastern jamb of the south window, some indications of the design having been altered from the original intention; though, as I think, this was an alteration made during the progress of the work, as neither the opposite jamb of the same window nor either jamb of the opposite window shows any such indications. The south window was, I believe, renewed in the fifteenth century, and again in the seventeenth century. Sir Christopher Wren informs us that it had been renewed about forty years before the date of his report.

The north window received its present form in the eighteenth century, and in no degree resembles its predecessor. Whether that which Sir Christopher Wren reports to be in a dangerous state was the original one, there is no means of telling.*

* From further examination since writing the above, I believe that both in the aisles of the nave, and in the lengths of the church and of the transept, the proportion reached to the centres of the walls, instead of (as was more usual, their internal face; if so, the last-named proportions would be almost exact.

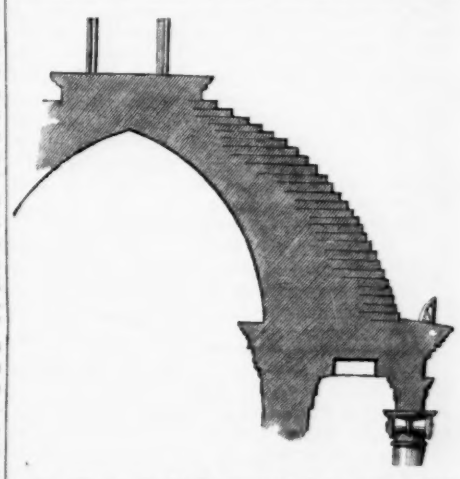
THE MAUSOLEUM AT HALICARNASSUS.

IN the lecture which Mr. Newton delivered on the 8th ult., at the Kensington Museum, on the result of his excavations at Halicarnassus, he admitted that his researches had not sufficed to enable him to restore the Mausoleum in all its parts; or, to speak more correctly, he showed that all Pliny's dimensions had been recovered except one, but that one is so important that the want of it renders the form of that celebrated structure still unintelligible.

First, let me explain what his excavations have made perfectly clear. He has recovered the entire Ionic order, and found that its height agrees as nearly as may be with the 25 cubits or 37½ feet assigned to it by Pliny. He has found that the twenty-four steps of the pyramid were each about 1 foot in height, and the quadriga almost exactly 14 feet; again making up the 37½ feet given by that author, and, as the whole building is said to have been 140 feet in height, this gives 65 feet for the elevation of the basement or podium. On this the pteron or peristyle stood. With regard to horizontal dimensions, the whole area of the foundation was found to be a square of 126 feet by 107 feet, on which the mausoleum stood, measuring, as nearly as can be calculated, from the steps of the pyramid, and other dimensions found, rather more than 112 feet by 93; and the circumference, therefore, again brings out the 411 feet of Pliny, while the cella or tomb itself measured 63 feet by 46 feet. So far all is satisfactory; but we now come to the one difficulty of the case: a certain number of the steps of the pyramid have been found; these all measure in height 11¾ inches, or, with the joint, say 1 foot; thus agreeing exactly with Pliny's measurement. But the upper surface or tread has hitherto been found of only two dimensions, 1 foot 9 inches and 1 foot 5 inches; and, moreover, a corner-stone has been found with these two dimensions on its opposite faces: thus showing that they were used in one course; and these two dimensions represented the corresponding proportional lengths of the sides of the pyramid.

Nothing could at first sight seem to be more satisfactory than this discovery; but when it came to be protracted, it was found that steps only 1 foot in height, and 1 foot 9 inches or 1 foot 5 inches in width, formed a pyramid so flat as to be, to say the least of it, very ungraceful; and what was worse, it spread the base of the pyramid so widely, that a distance of about 22 or 23 feet was left between the centres of the columns and the walls of the cella; a space so wide that the constructive means of neither ancients nor moderns was equal to cover it, by any known expedient of marble architecture. This is the difficulty above alluded to, and which has hitherto been unsolved. As soon as Mr. Newton's, or rather Lieut. Smith's, restoration was published in the Blue Book in the beginning of last year, it occurred to me that the solution probably lay in the words of Pliny, who, in speaking of the pyramid, describes it as "*in metæ cacumen se contrahens.*" If it had been a straight lined pyramid, like those of Egypt, this qualifying phrase would not have been required, but certainly meant something; and the meaning appeared to me to be that the roof or pyramid was curvilinear. I came to this conclusion, because all the metæ or goals with which I am acquainted terminate in a curvilinear form upwards; there may be exceptions, but I have never met with them in any sculptural or painted representations of these objects. As this theory solved all the difficulties of the case, I got Mr. Penrose to write at once to his friend Mr. Pullen, the architect of the expedition, who was still at Budrum, and to request him to search for, and measure every fragment of roofing stones he could find, in order to settle this question one way or another. He found nothing, however, bearing on the subject, and it was only about a fortnight ago that I met Mr. Newton, on the eve of his departure for Rome, and mentioned my theory to him. He had never heard of it before, but at once admitted its probability; and more than this, told me that there were two roofing stones in the British Museum, the treads of which were 9 inches and 6 inches respectively, but that they had been put on one side, as not according with the received theories of restoration.

I have since then seen these stones. With regard to the 9-inch one, there is no doubt. The 6-inch stone wants the usual ridges, but from other circumstances, appears certainly to have been a roofing stone; but this is of little consequence. The existence of one stone of a third dimension proves incontestably that the pyramid was not straight-lined; and as I have no doubt but that many more exist of other dimensions, no further proof is needed, and all that is now required is to determine what the curve of the roof was. This can only be determined by a more careful investigation than I have yet had time to attempt; but in the meanwhile the annexed diagram will explain, perhaps, better than words, what I conceive to have been the general construction of the roof of this celebrated monument.



It will, no doubt, be suggested by some, that this is an ungraceful form; by others, that it is unlikely, because unusual. With regard to the first, I would only remark that it is a matter of taste, and that when the curve comes to be properly investigated, I, for one, feel convinced that it will be found far more graceful than any straight-lined form. With regard to the second objection, I would remark that it appears almost certain that the cella was roofed with a pointed arch of horizontal construction. This mode of arching was so usual in that part of the country at that time, that it could hardly fail to be adopted, and it is, consequently, more than probable that the external curve would follow the internal. True construction would almost require it.

It must also be borne in mind that all the true Lycian tombs adopt the curvilinear pointed form of roof externally, and consequently, that form was not only usual, but appropriate, and the one most likely to be adopted in these parts. But these arguments are beside the subject. We have to deal with facts, not with opinions or theories. So far as I can understand the matter, it appears that the artistic requirements of the building would, most probably, suggest the curvilinear form of roof. The constructive necessities of the case seem imperatively to demand it; and what is of more importance still, the stones themselves prove, beyond a doubt, that this was the form adopted; at least so it appears to me, and so I fancy it must stand till some one can

* To be continued.

propose a theory more in accordance with the words of Pliny, or with the result of Mr. Newton's explorations. J. Fergusson.

CHRISTMAS.

There are several points of view from which this period of the year, with its home-comforts, bright decorations, and family unions, has a right to a passing word in our pages. None, however, more obviously than the point of view charitable. There is need for all the kindly hands that can be stretched out. There are hundreds of poor misguided men, with their wives and children, who, according to accounts which have reached us, and those that are published, are half-starved. "It is most heart-rending," writes one on the part of the labourers, "to behold the once strong man (with poverty depicted in his emaciated features) starving in the streets of London. Look into his desolate home, and behold his wife and children badly clothed and worse fed." Let those who have it in their power seek to alleviate the distress which evil counsel has caused. There are many public institutions, too, which should be aided at this time of the year.

In the churches, in our great cathedrals, in the venerable abbey at Westminster, the day is observed with solemn reverence. In the latter place the service is singularly impressive, aided as it is with the associations of the spot; associations which a paper in our present number will revive. What pictures come to mind of former Christmas observances—the rude feasting of the Saxons—the more courtly graces of the Norman festivals—the masking of Queen Elizabeth's days. Notwithstanding the alterations in time and circumstance, the friendly spirit of this season has not been lost. In the workhouses, in reformatories, in ragged schools, there is much decking with holly and evergreens, and extra fare is provided. At the Foundling Hospital, and a hundred other institutions, Christmas-day is not forgotten. In the picturesque old hall of the Charter House there will be found a picture which has little varied in its aspect for 300 years. Even in the prisons the day does not pass without note. In Windsor Castle, as has been the case for centuries past, in its kitchens, a busy scene of preparation will be presented; and there, while refined delicacies have been introduced, the "Roast Beef of Old England" has not been allowed to fall out of fashion, and the huge "baron," which takes two nights and one day to roast, is as superior in size and quality over that which was obtainable half a century ago, as the English ox now is to that of France.

The decoration of the shops at this time of the year suggests considerations. Some few give evidence of an amount of artistic feeling and ability which, if training had been afforded, would have enabled the persons by whom those displays were made, to have taken positions in some recognized department of the arts.

An ordinary wanderer in the London streets cannot fail to mark the great difference observable in some of the shops which meet the eye, though he may regard the effect produced as the result of chance. A more careful observer notes in the windows of the linen drapers, silk mercers, milliners, and others, that it is by arrangement the attraction noticed is produced. There is a shop on Ludgate-hill, for example, where in the spring time the window harmonizes with the season. Primrose tints, delicate greens of many hues, the blushings of colour are shown by proper contrasts. In the summer, in the autumn, in the winter, that shop exhibits a correspondence of tint. Even changes in the weather are duly considered: if the summer sun shines brightly, the most cool and refreshing colours meet the eye; if clouds prevail, more enlivening tints appear.

In several London shops, notwithstanding a general uniformity, there are great varieties in detail observable. In one shop the artist seems to have been endowed with the spirit of Titian: rich, full, yet harmonious colours are set forth. In another a Watteau-like spirit prevails. Another artist, guided, perhaps, in some measure by the nature of his materials, affects a Rembrandtish arrangement: deep and solemn tints obtain, which set off with great brilliancy the sparing bit of bright colour.

In a mercantile point of view, the architectural decoration of the shops and the tasteful display of the goods are of vast importance, and it is surprising how much attraction and effect can be given by the general arrangement, which may be considered similar to the composition of a picture, and by this harmonizing and judicious foiling of colours. We believe that this talent is appreciated in trade, and that the Titians, Correggios, and Rembrandts of this art are highly esteemed. They are not so numerous as they might be. If men likely to be engaged in such trades were to study the theory of colours, and get a knowledge of art generally, they would find that knowledge a power, and a paying one too.

It is a genial and well-disposing time this Christmas: and whether we inquired of our royal party at Windsor Castle, of Lady Vere de Vere in the baronial hall, of Mr. and Mrs. Smith in their little box at Clapham, or steady John Plane, the joiner, in his less comfortable two rooms, we should discover many kindly things done, and learn that the poorer were not forgotten. The hobby-horses and the dragons have disappeared, but the best spirit of the "old times" still animates the New.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The usual meeting of members was held on Monday evening last, at the house in Conduit-street, Mr. Hussey, V.P., in the chair.

The minutes of the last meeting were read and confirmed.

Mr. C. C. Nelson (Hon. Sec.), read a list of donations to the library.

Mr. G. Gilbert Scott then read the second portion of his paper, entitled "Gleanings from Westminster Abbey," which we commence to give elsewhere in full.

At the conclusion the Chairman said, he feared that little time remained for any lengthened debate upon a paper suggestive of so much interesting matter. He was sure, however, that they were all deeply indebted to Mr. Scott for the labour and research which he had bestowed upon the subject.

Mr. Godwin observed that, although time might not permit any lengthened discussion upon the elaborate and admirable account of Westminster Abbey delivered by Mr. Scott, still there was one point which he thought ought not to be passed over without some expression on the part of the meeting, which might have the effect of strengthening Mr. Scott's hands: he meant with respect to the restoration of the Chapter-house. No one could see the casts of its exquisite ornamentation, and the view on the wall showing the present condition of that beautiful apartment, even if he did not know the building itself,—no one could reflect on its present condition, chopped about and destroyed,—its pavement hidden,—its proportions obscured with presses and enclosures, without expressing a hope that speedy means would be taken to restore a work of so much interest and beauty. The water-colour drawings exhibited in the room showed the Chapter-house in all its beauty and magnificence of colour and carving; and the mere act of restoring it would in itself be the means of strengthening that school of decorative art which they were all so glad to see again springing up in England. Under these circumstances he thought it would be advisable that they should pass a resolution, at some proper time, calling upon the Government to assist the Abbey authorities in restoring it to its original shape. He would not trespass further on their attention at that moment, but conclude by moving that the thanks of the meeting be awarded to Mr. Scott, for his admirable paper, and its beautiful and instructive illustrations.

The Chairman said it would be impossible not to concur with Mr. Godwin in the great importance of rescuing from further decay so beautiful a specimen of early art as the Chapter-house at Westminster; and, if any representations of theirs could induce the Government to move in the matter, he was sure they would not be wanting.

In reply to a question,

Mr. Scott explained, that the mode adopted by him of hardening the stone, in cases where internal decay had set in, was by the use of shellac in a solution of spirits of wine, applied with a syringe.

Mr. C. H. Smith said he wished to say a few words with regard to the materials used in the construction of Westminster Abbey. There was no building with which he was acquainted in which so great a diversity of materials appeared to have been used. The early portion, constructed in the reign of Henry III., was built with the green sand, or Godstone. The stone gave the name to the place. A large portion, including the Jerusalem chamber, was made of this stone, which was similar to our common "hearth-stone." Then there was Purbeck marble used in the interior, and Caen stone. In some of the old cloisters magnesian limestone, similar to that in the new Houses of Parliament, was found. Dean Buckland appeared to have doubted this, but he (Mr. Smith) convinced him of the fact. Sir Christopher Wren, who restored a portion of the Abbey, found that these stones had decayed four inches from the original surface, and he repaired them by using stone found in Gloucestershire. The whole of the building, from the northern transept to Henry VII.'s chapel, and thence to Poets' Corner, was restored with Gloucestershire stone. In later times, Henry VII.'s chapel was restored with Coombe Down Bath stone.

Mr. Scott said that in the old bills of particulars, preserved among the muniments of the Abbey, the stone was stated to have come from Reigate (Godstone was not mentioned) and from Caen. Among the items was a payment to a man for finding a new quarry. The Abbey people, it would seem, worked the quarry themselves, and fashioned the stone, which appeared to have been deposited at a place called "the Garden," at Battersea. They had stone also from a place called Beer or Bur, and from Stapleton, which he supposed was near Pontefract. A good many entries also appeared of what was termed "North stone," probably meaning Stapleton.

Mr. Smith said that Reigate and Godstone stone were substantially the same. He begged to know whether the bills of particulars referred to by Mr. Scott were in English or Latin.

Mr. Scott said they were in Latin, but that English words were sometimes made up into Latin in a very off-hand manner. The English term wainscot was used to denominate oak or boards, a very early instance. With regard to the paintings on the walls, &c., they appeared to have been done in oil or varnish. This seemed to have been the opinion of Sir Charles Eastlake. There were many entries in the old bills of particulars of cash paid for oil and varnish, and there could be no doubt that resin had been added to the oil, as described in some of the old receipts.

Mr. Lewis inquired whether Mr. Burtt, the keeper of the records, had discovered any trace as to who had been the architect of the building.

Mr. Scott said he thought not; but that as Mr. Burtt was present, he would, perhaps, answer for himself.

Mr. Burtt said he had not been able to discover any entry or allusion to any architect engaged on the building. There was nothing but bills of particulars, which referred to mouldings and architectural details.

Mr. Scott said that, in the latter part of the reign of Henry III., there appeared to be a change in the name of the master mason; but whether the master mason meant the architect or not, he could not say.

Mr. Burtt said the works at one time appeared to have been under the supervision of Adam de Stratten, a person who got himself, afterwards, into trouble, on account of some peculations of which he had been guilty. The master masons appeared to have been changed every two or three years; and, judging from their names, they were probably Englishmen.

Mr. Ferrey inquired whether there was any means of ascertaining how the masons set out their work. He had lately been engaged in the restoration of Christ Church, in the south-west of England, and, on examining the plaster of an apartment which probably was used by the master mason, he found the lines of a regular window set out. Upon examining the plaster carefully, he found the complete outline of a beautiful geometrical window, with its mouldings all marked complete. Upon taking the dimensions and comparing them with an opening in the south aisle of the nave, he found the window to correspond exactly, and the mason was now making a new window from the original tracing on the plaster. He had never met with the outline of a window traced in so complete a manner.

Mr. Scott said he had not been able to find anything of the kind at Westminster Abbey, but suggested that if the record-chests in the triforium were ransacked they might find the original drawings of the abbey.

Mr. Ferrey expressed his hope that a search would be made, and that the result might be communicated to the Institute. He also asked Mr. Scott whether he had discovered any building so like Westminster Abbey as to warrant the opinion that the same architect had designed both. He had been struck with the close resemblance between the mouldings at the church at Farnham and those at St. Cross, near Winchester. They seemed to have been worked from the same moulds.

Mr. Scott said the nearest approach to Westminster Abbey he had seen was the north tran-

sept at Hereford Cathedral, which, however, was not equal in merit, although there could be no doubt that the architect of the latter had seen Westminster Abbey.

Mr. Burtt said that in the accounts preserved in the muniment-room there were several notices for small buildings for the use of the masons; but, whether they were external or mere temporary workshops, there was nothing to show; but there could be no doubt that the architect erected buildings for the use of the masons, and as places of residence.

Mr. Scott said it was remarkable that in England no original drawings were to be found, with the exception of some small drawings for the tower of King's College, Cambridge.

Mr. Ferrey seconded the vote of thanks proposed by Mr. Godwin, and observed that it was impossible to over-rate the value of such a communication.

The Chairman having put the motion, which was carried by acclamation,—

Mr. Scott returned thanks for the compliment; and reverting to the observations of Mr. Ferrey with reference to the restoration at Christ Church, Hampshire, said that a parallel case had occurred at Amiens, where the vaulting was set out on the pavement of the church, with the sections of the ribs, &c., complete.

Mr. Smith said he had seen the same practice pursued at Rouen, by the masons of the present time.

The following gentlemen were balloted for and elected:—

Messrs. W. A. Boulnois, already associate; J. Edmeston, associate; James Fergusson, associate; J. M. Lockyer, associate; G. W. Mayhew; E. Nash, associate; Joseph Peacock, associate; William Slater, associate; G. E. Street; and William White, as fellows: and Messrs. Henry Dawson, F. Judge, and C. J. Knight, as associates.

Professor Semper, of Zurich, was elected honorary and corresponding member.

The next meeting will be held on Monday, the 9th of January.

MILFORD HAVEN.*

THE singular natural advantages of Milford Haven as a harbour of refuge are well known to mariners; and since 1814, when the dockyard establishment near Pembroke was commenced, these and other advantages of the locality, in regard to the public service, have been growing in appreciation of the Government. The Report before us, addressed to Col. the Hon. R. Fulke Greville, by Mr. Page, aims at showing that the Haven possesses still further advantages, such as are greater than those of Liverpool and Southampton for passenger traffic, and greater than those of the arsenals and dockyards of the south coast for use in time of war.

The conditions that would have guided selection of site for a port, or a dockyard, have become greatly altered through the progress of invention in recent years. Mr. Page has gone elaborately into discussion of the changes wrought by steam, as applied to locomotion by land and sea, and has examined the probable effect in any future contest, of the inventions of a warlike character. The result is the demonstration of new conditions, which are answered by Milford Haven, as the locality beyond all others for a port for ocean steam-vessels, as well as for a station and arsenal for ships of war.

The advantages of the Haven, in the consideration of safety and time, are shown whether as compared with Southampton or with Liverpool, and whether for the metropolis, or for the manufacturing district of Lancashire—with the formation of sixty additional miles of railway. Even as compared with Galway for American steamers, it is shown there would be a saving in time. The reasons for the preference over Southampton, for passenger traffic and expensive merchandize, are, in the first place, the same as those which caused the change to Southampton from London; and, secondly, the close vicinity of the Welsh coal-field, added to the area at low-water of the Haven itself. The great rise and fall of tide also, gives an advantage for graving-docks; whilst through the excellent beaching-grounds, large iron ships could be examined without expense of going into dock. The reasons in favour of the station for ships of war, are the same vicinity of the coal-field, the area, and the distance of the anchorage from the entrance of the Haven. The positions of Dover, Portland, Portsmouth, Devonport, and other harbours, are compared in the report, with the positions of the chief naval stations of the French; and the vulnerability of the former, and the comparative safety of the latter from natural advantages (except Cherbourg, which is most strongly fortified,) are shown.

An early port, and a quick transport from the steamer to the railway, especially considering the class of steamers now built, afford the greatest safety and the true economy. Consequently, the conditions of a port for ocean steam-ships, putting the heads partly in our own words, are:—

1. Easy access and departure in all weathers.
2. Ample depths of water at all times of tide.
3. Facilities for speedy and economic supply of coal.
4. Direct communication with the metropolis and the manufacturing towns.
5. For ships bound west or south,—the most rapid communication with the Atlantic—saving sea distance and dangers, at the expenses of railway communication.
6. Distance from a hostile coast.
7. Security from any sudden attack.

These advantages might be secured, in the first instance, by little more than the construction of a pier into deep water, at Newton Noyes, near Milford, and the connection with it of the railway, as appears from the result of Mr. Page's examination of the northern shore of the Haven. We may advert, however, to the circumstance, that greater depth of water than is provided under this arrangement would be needed for coaling the ships of war; since, whilst the opinion is given that it would be dangerous for a three-decker to lie at anchor in a gale of wind with less than 5½ or perhaps 6 fathoms of water, the end of the pier immediately proposed would terminate in 5 fathoms. Doubtless, however, the requisite depth might be secured at Newton Noyes, or contiguously.

The Report goes carefully into the comparison of the relative naval powers of England and France—giving the superiority for the steam navy, as well as the navy generally, to England, both in vessels and guns; considers the progress made with heavy ordnance of long range, and destructive engines of new character; and, altogether, comprises a great body of information bearing upon the points in question. Seeing that there is reason for the assertion of the Report, that Sheerness, Portsmouth, Devonport, and Keyham dockyards could be set on fire in a night attack, even within an hour, there can be no doubt of the importance, just now, of a due consideration by the Government, of the matter which Mr. Page has advanced.

* "Report on the Eligibility of Milford Haven for Ocean Steam Ships, and for a Naval Arsenal." By Thomas Page, Civil Engineer; Member of the Institution of Civil Engineers; Fellow of the Geological Society of London; late Acting Engineer of the Thames Tunnel. 4to., pp. 62. Three Plates. London: 1859.

HOGARTH.

MANY visitors to the National Gallery will regret the absence of Hogarth's pictures, and it has been suggested that a collection of the whole of the works of this painter, which are scattered about in the Soane Museum and elsewhere, would make an exhibition of very great interest and use.

At the present time, the works of one of the greatest English painters are not properly appreciated: his name and reputation are familiar to all; but it is rather as the great moralist and satirist that he is famous amongst the multitude, than as an artist of very high class: for minute detail, effect of light and shade, harmony of colour, and other qualities, several of the pictures of Hogarth will bear comparison with the finest works of other schools.

In Oxford-street, nearly opposite Rathbone-place, there is one of the old signs which once formed an important feature of the streets of London, but which are now rarely to be met with. It excites some curiosity, not only from the peculiar nature of the subject, but from it being supposed, on good authority, to have been the work of Hogarth. This street picture shows a stout old gentleman, with large, patience-tried features, dressed in the costume of about a hundred years ago, carrying a buxom female on his back: the lady has a monkey on her arm: there is a cat and dog fighting, and other unpleasant matters; and below are the words,—"A man loaded with mischief." The colour, effect, and drawing of this sign are excellent, and serve to show that in those days gone by they were not mere daubers who were employed in this department of art.

Hogarth took much interest in the London signs; and, notwithstanding his great industry in his art, delighted to wander in the streets of the metropolis. Mr. Dawes, a pupil of Hogarth, mentions that, when the great painter had his "Analysis of Beauty" in contemplation, he had more than once accompanied him to the Fleet-market and Harp-alley, adjacent, which were in those days the great marts, and indeed exhibitions, of signs of various descriptions, barbers' blocks poles, &c., and which were then in much request. In these places it was the delight of Hogarth to contemplate the works emanating from a school which, he used emphatically to observe, was truly English; and frequently to compare them with, and prefer them to, the more expensive productions of those he used to call the "Black Masters," a name that he applied to the smoky productions which were then so much in fashion, in the times mentioned; and are perhaps so at present. Bad copies of Italian and Flemish pictures were regularly manufactured, and annually sold, obscured by dirt and smoke, and scumbled down with asphaltum.

It was the delight of Hogarth to consider the blocks, which used to be ranged in these shops in great order, one row above the other, like the spectators in the galleries of a theatre at different points of view; to remark on the different characters which the workmen had bestowed upon their countenances; and to endeavour to guess from their appearance at their dates, and to deduce the effect which they would have if decorated with the various wigs which the fashions of different periods might have clapped upon them.

In 1762 Mr. Bonnel Thornton projected an exhibition of signs, to this, however, Hogarth appears to have been but a trifling contributor. Amongst the heads of distinguished persons were those of the King of Prussia and the Empress of Hungary. Hogarth touched with chalk and altered the cast of their eyes, so as to make them look significantly at each other. The sign of Camden, the historian, with those of other worthies, found a place in this curious exhibition.

THE DRAINAGE QUESTION AT LEAMINGTON.

"The rainfall to the river, and the sewage to the soil."

AT a recent meeting of the Local Board of Health, Mr. Hitchman proposed the following resolution:—

"That an offer be made to the Earl of Warwick of the sewage of Leamington for a term of years, to be transferred to a tank, in a suitable state for agricultural purposes, conditionally that he erect his engine and pumps, and lay a pipe for the conveyance of the same on to his land, as the basis of an agreement to be entered into between the board and his lordship."

In course of his remarks, the proposer of the resolution urged that they had the evidence of other towns that the deodorizing works were losing concerns; that, at Cheltenham, where were the most efficient, they scarcely paid their working expenses. So, if they were going to lay out several thousand pounds in deodorizing works and filtration beds, he thought they would incur much loss.

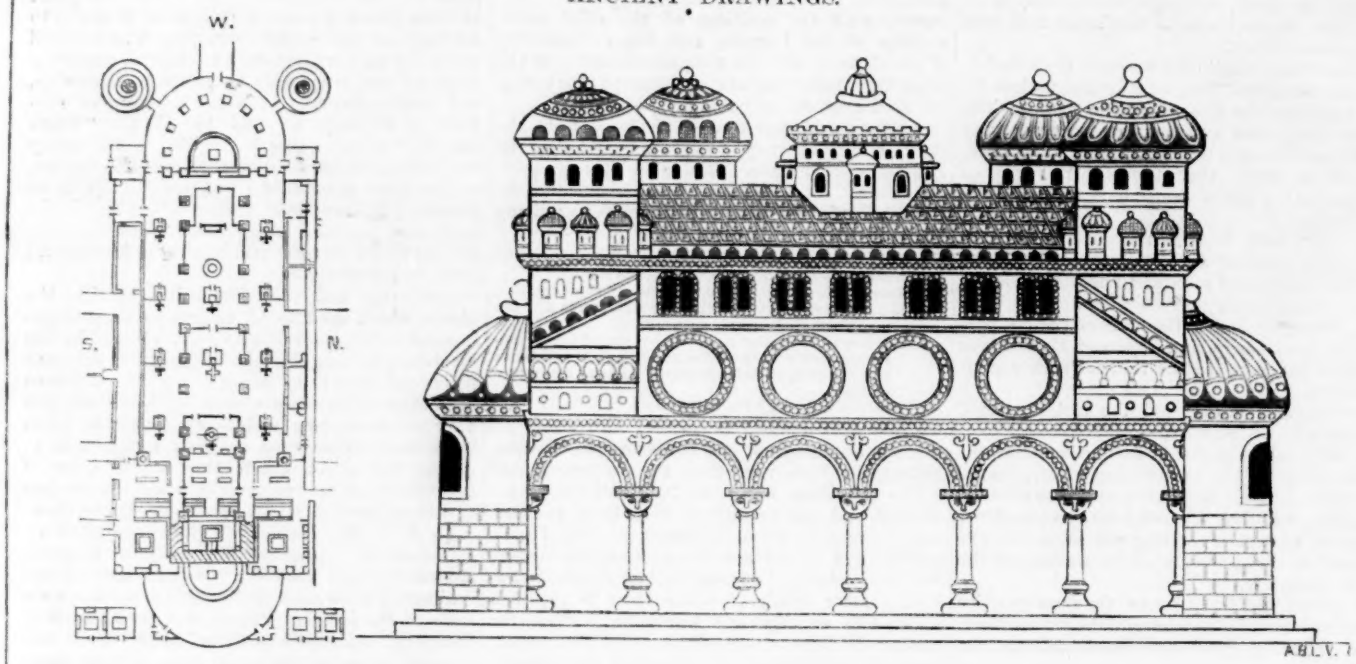
A previous agreement having been entered into with Lord Warwick, on the basis of the deodorizing system, as to which Mr. Austin, C.E., has been employed to carry out a plan, this fact was urged in opposition to Mr. Hitchman's proposal, which was finally, after some discussion, rejected by a considerable majority of the members present, although it was stated that there was good reason to believe that Lord Warwick was willing to consider the new proposal, if adopted by the Board and submitted to him.

In a letter to the *Leamington Courier*, Mr. Hitchman says of his plan for the disposal of the sewage (which, in fact, is just that embodied in the axiom, — "The rainfall to the river, and the sewage to the soil"),—

"I believe that, in order to render the sanitary arrangements of towns perfect, and to extend the utilization of that important part of the refuse which is so valuable as a fertilizing agent on the land, it is absolutely necessary to have three distinct conduits ramifying through them, instead of the two usually employed,—namely, 'a pipe,' 'a drain,' and 'a sewer.' It would tend to the simplification of sanitary science and to the welfare of the community, if, in this vocabulary of sanitary nomenclature, the distinction between them, both in name and use, was always strictly preserved. The term 'pipe' should only apply to the pipe to convey the pure water-supply. The term 'drain' to the drain only to convey the rain or surface-water from the town to the river as the natural water-course. And the term 'sewer' to the sewer only to convey the valuable house sewage, mixed with the water-supply in closets, &c., into its tank, in as suitable a state as possible for application to the land, to fertilize it. A main-drainage system ought to be confined to the removal of the surface-water. A main-sewerage system to the removal of sewerage."

Mr. Hitchman is quite correct in insisting on strict definitions. There is one word, even in his own statements, which is used erroneously,—namely, "sewerage." Removing the sewerage of a town, strictly speaking, signifies desewering the town, not removing the sewage or sewer-contents. "Sewage" and "sewerage," though frequently used by Mr. Hitchman as synonymous, are words with very different meanings, and ought not to be indiscriminately used.

ANCIENT DRAWINGS.



Church of St. Gallen, Switzerland. A.D. 820. *An Ancient Elevation.*

RESEARCHES IN LIBRARIES.

I. ANCIENT ORIGINAL DRAWINGS.

St. Gallen (Canton St. Gallen), Switzerland. Library: Design of a great Cloister.*

Although this important and oldest design is, I think, well known to the archæological world, I still deem it necessary to remark upon it.

It bears date in the year 820, and represents the design of a great cloister for the Benedictine Order. The name of the originator is unknown. The original is drawn in *red* lines on four parchments sewn together, while the explanation of all prominent and particular portions is written in *black*, in Latin hexameters.

The entire arrangement of the cloister buildings represents a perfect little town, with the church in the centre.

[See the figure: a representation of the whole plan would occupy too much space in your journal, even on a greatly reduced scale, but an accurate fac-simile is in my possession for the benefit of those interested in such matters.]

Two round towers are placed at the west end of the church [detached from it], one to the south the other to the north, the former of which has the significant inscription, "*Alter similis*," and the purport of them is quoted to be, "*Ad universa superinspicienda.*" These towers being placed in the west and the principal altar in the east, prove the consecrated direction "west to east," although, in the plan, the longitudinal direction is expressly marked "*ab Oriente in Occidentem.*" At the west end of the church is further shown a *second* choir, with apsis [in the plan called "exedra"]. This singular arrangement occurs again only in Germany, and we shall, in our following sketches, have very interesting examples. The west apsis is surrounded by a concentric colonnade,—the east one with a concentric wall. The enclosed space is named "Paradisus."

Stuttgart (Kingdom Würtemberg), Germany: Royal Public Library, in Neckar-street.

I found there, executed on parchment, in red and black† colours, and pasted to the inner side of the back-binding (Bibl. fol. No. 57.; Ex Bibl. Zwifalten, Sæc. xii.) a very interesting elevation. The accurate illustration of it speaks for itself.

[A fac-simile of the original is in my possession.]

Berlin (Kingdom Prussia, Germany) Royal Library. (MS. Germ. Oct. 109.) Life of Maria. Poem (last quarter of the twelfth century). By Scholasticus Werinher, of Tegernsee‡ (✠ 1197).

This epic poem is illustrated with eighty-five pictorial representations. In the works of this period we seldom find a proper arrangement of groups; the heads are somewhat large, faces, monotonous, and the position of the bodies sometimes distorted, *i.e.*, in these representations we see that the artist's knowledge of the structure of the human body was very limited. The figures and objects are drawn in outline in red and black, the flesh is always in black, red is applied to distinguish the clothing from it, and to mark the difference of clothing in groups. The cheeks are marked by red spots, and the under-lip by a red line.

But amongst the whole there are two representations (the lamenting Mothers of Bethlehem and the Damned), which, *considering the age*, surprised me by their power and clearness.

In the group of the lamenting Mothers of Bethlehem, notwithstanding faults of drawing, the fall of drapery is grand; the expression of grief in the countenance, and the various attitudes, are remarkably fine.

Had Werinher had the means at our command, what might he not have accomplished?

A. le Vengeur.

* With regard to pictorial and ornamental objects, which I found in this and other libraries, I shall refer to these further on.

† In our fig. all lines, &c., drawn in *pale* colour, are on the original in *red* colour.

‡ Tegernsee is a monastery in Bavaria.

NEW STAFF COLLEGE AT SANDHURST.

The first stone of the projected college for officers of the army who, having served a probation in regimental duties, seek by a higher course of training to qualify themselves for Staff appointments, was laid at Sandhurst, on the 14th, by the Commander-in-Chief, the Duke of Cambridge.

The new Staff College will be situated on a gentle slope, from half to three-quarters of a mile to the eastward of the Cadets' College, and within the spacious grounds attached to the last-named establishment. The new edifice, the foundations and basement of which are already laid, up to within a foot of the ground floor, is expected to be completed in eighteen months. When finished it will afford accommodation for forty students. The building will be 265 feet long, 110 feet broad, and 55 feet in height, its style of architecture Modern Italian, and the material brick and stone. The main entrance will be by the western front, and over it the Royal arms will be emblazoned, surmounted by the crest of the college. At each end will be a tower, rising about 20 feet above the rest of the building. The principal apartments will comprise the great hall, lecture-rooms, study-halls, libraries, and mess-room. The hall will be approached from the front by a vestibule, and communication will be had to two spacious quadrangles by lengthened corridors. A stone staircase will lead up to the first floor, and on the landing there will be an ornamental balustrade surmounted by Ionic columns.

The contract also includes the erection of suitable residences for the commandant and adjutant of the college, together with stabling for a stud of forty horses. The works are under the direction of Colonel Chapman, C.B., of the Royal Engineers, assisted by Captain Gray and Lieutenant Bowdley, Royal Engineers. Mr. Myers has the contract. The completion of the building is estimated to cost from 40,000*l.* to 50,000*l.*

SOCIETY OF ENGINEERS.

At the recent annual dinner of this society, the honorary secretary, Mr. Alfred Williams, gave a general review of the society from its commencement, and stated that it was originated in the year 1854; that in 1855 it consisted of only twenty members; that from that date it had gradually increased in numbers, and at the present time there were upwards of 150 members belonging to the society; and that the attendance of members at the monthly meetings had increased from twelve to seventy-five. He also stated that the society included civil engineers, engaged professionally on their own account, assistants and pupils of engineers, manufacturers, and scientific men, connected collaterally with the profession; and the subscription being only the nominal sum of 10s. per annum, he anticipated shortly a large increase of numbers. At present, the society held their ordinary meetings in the Lower-hall, Exeter Hall; but, with largely increased numbers, and an addition to the finances hereafter, in the shape of an admission fee, he thought it not improbable that in a few years they might be able to meet in a house of their own.

ST. THOMAS'S CHURCH, WELLS, SOMERSET.

This church was erected by the late Mrs. Jenkyns, in memory of her husband, the late master of Balliol College, Oxford, and Dean of Wells. It is built of stone of two colours, quarried from the neighbourhood. It consists of a five-sided apsidal chancel, a nave, and north aisle, a tower surmounted by a spire standing at the east, and a south transept. The interior is ashlared with stone: the shafts of the columns of the arcading are of blue lias stone. All the fittings are of oak. The chancel, of which the interior is represented by our engraving, is divided from the nave by a breast-wall of stone, has five two-light windows, the subjects of which are types of the old and the antitypes of the New Testament. These windows were executed by Wailes, and presented by the members of the University of Oxford. There is also a three-light window on the south side, the subjects of which are from the life of St. Thomas, to whom the church is dedicated. The reredos is of stone and marble, enriched with mosaics and polychrome, enclosed by an altar-rail of brass, by Skidmore. The whole of the roof is enriched with a polychromatic decoration and gold. The stall-work is of oak, carved. The pavement is in stone and encaustic work. The pulpit is of stone and marble, with some metal work in connection. Mr. S. S. Teulon, of Craig's-court, was the architect.

ST. THOMAS'S CHURCH, WELLS, SOMERSET.—MR. S. S. TEULON, ARCHITECT.

CAMBRIDGE GUILDHALL COMPETITION.

THE premiums for the Cambridge Guildhall have been thus awarded:—

First premium—"Utility"—authors, Messrs. Peck & Stephens, of Maidstone.

Second premium—"*Treu und fest*"—authors, Messrs. John & Wyatt Papworth, of London.

The following is the Referee's report on the first selected design:—

"The hall and assembly-room is from north to south, on the first floor, and is 113 feet long by 54 feet wide, exclusive of an organ recess. The whole of the ground-floor is appropriated to store-rooms, except next Butter-row, where are the town clerk's offices.

Next Wheeler-street is the entrance for the musicians, with a living-room and bedroom for the hall-keeper, and a room for the ordinary musicians, with separate staircase up, and on the first floor a room for the superior musicians.

The access to the assembly-room will be by the staircase of the shire-hall building, in one width, communicating by a bridge across Butter-row.

This arrangement is very simple, and forms a very fine plan; but the present assembly-room is not sufficiently made use of.

In order, however, to provide accommodation for the library and reading-room and school of art, the plot next Peas-hill is appropriated *provisionally* for these purposes; the reading-room and free library being on the ground-floor, and the art department on the two upper floors. This arrangement *in itself is unexceptionable*, but it will absorb some hundreds of pounds, as the building will hereafter have to be removed to make way for the corn market, which is proposed to be 76 feet by 66 feet.

The style is free Italian: the masses are well grouped, *of the finest class of design*, and effective, as contemplated to be ultimately carried out. The whole forms *a noble mass*. The interior is gracefully designed and the assembly hall striking in its appearance, being without galleries, but the details are too clumsy and heavy.

The estimate for the present buildings is 6,000*l*. By a clerical omission of the amount, the calculation of ultimate expenditure is not stated."

(After this was printed, a paper was sent in by the authors, stating that the ultimate expenditure is estimated at 25,000*l*.)

The following tabulated statement of the accommodation provided by the two designs was drawn up for the committee by Mr. Rowe:—

	Size of School of Art in feet.	Size of Free Library in feet.	Size of Public Reading Room in feet.	Number of persons to be accommodated in Assembly-room, allowing 4ft. superficial for each.	Estimated Expense.
Utility.	26 feet by 20 feet.	27ft. 6in. by 12ft. 6in. *temporary.* 26ft. by 20ft. *permanent.*	32ft. by 21ft. 6in. *temporary.* 28ft. by 27ft. *permanent.*	1,261. (The room is 97ft. by 52ft.; but it is figured 113ft. by 54ft.	£25,000.
Treu und fest.	[69ft. by 28ft. 6in. and a second room, 35ft. by 18ft.	40ft. by 24ft.	37ft. by 24ft.	1,465.	£15,000.

CAMBRIDGE ARCHITECTURAL SOCIETY.

ON December the 10th, a meeting of the society was held, the Rev. H. R. Luard in the chair. Mr. J. W. Clark, Trinity College, delivered a lecture "On Greek Temples," illustrated by photographs and engravings. After a short discussion, the meeting adjourned. The report of the society for the years 1858, 1859, says, *inter alia*,—

"Among the restorations lately completed in the University and town, that of St. Edward's Church undoubtedly holds the first place. We would especially commend the western door, and the window to the town, designed by Mr. Brandon. The idea of an internal porch, there being no room for an external one, is original, and fairly executed. With regard to the interior, while no one can fail to admire the great change for the better in every way, we are sorry that we cannot give increased praise to the restoration on which so much care has been spent, and to carry out which so many difficulties and vexatious annoyances have been overcome.

At Queen's College, a thorough restoration of the hall, chapel, and other buildings, is in progress, under the care of Mr. Borley, an example which we hope other colleges may follow as judiciously."

PROPOSED SCHOOL OF PRACTICAL SCIENCE IN CAMBRIDGE.

ENGINEERS' PUPILS.

Mr. G. ROBERTSON, resident engineer at the Leith Docks, remarks on this subject,—"From 1847 to 1850 I was educated at Putney College, and there acquired information, useful to a civil engineer, which I should never have obtained afterwards on works, or found time or opportunities to study in private.

The great mistake made by Putney students, and which accounts for so few being heard of in the profession, was attempting to start on their own account as civil engineers, only on the knowledge acquired there, without having passed through a pupilage. Trying to climb over the wall, instead of going in at the door.

A lower premium, and perhaps shorter pupilage, are concessions which civil engineers would be wise to grant to well-educated men, instead of setting their faces against college education. They would get lower premiums certainly, but better men.

The great obstacles to the combination of a scientific education with a practical one are the expense and the *apparently* late period at which the student begins to earn his living. I say apparently, because it is really early in comparison with the 'learned' professions. Besides, as a general rule, when a salary is to be got in a profession at an early age, as in Government offices, promotion is slow afterwards; and, in this case, it is not 'the early bird that gathers most straw.'

I would strongly urge the importance of giving the scientific education *first*, and the practical one afterwards; not only because a man should learn the reasons of things first, but because pupilage is the door into the profession which it is unwise ever to shut afterwards. The premium is given not only for information but for patronage and connection."

THE MANCHESTER ASSIZE-COURTS.

WE are informed that the site selected for these courts has been cleared of the remains of its former buildings, and a contract entered into with Mr. Robert Neill, of Manchester, for the construction of the foundation-walls of the new assize-courts.

The work has now been for some time in progress. It has been found necessary to sink the walls to a considerable depth, in order to secure for them a perfectly firm, solid bed. The footings of the walls are all hard flag landings, from 6 to 8 inches in thickness; and both the footings and the brickwork above are set in mortar, made from Ellis's "Barrow Lime."

Meanwhile Mr. Waterhouse, the architect of the works, is actively engaged in completing the details of his design, which are expected to be finished by the end of January next; when the committee of magistrates intend advertising for tenders for the main works above ground, which, it is understood, will be comprised in one contract. Yorkshire stone has been selected by the committee, as that best adapted on the whole for the exterior of the building.

MANCHESTER NEW ASSEMBLY-ROOMS.

THE new assembly-rooms, erected in York-street, Cheetham-hill, close to the town-hall, were opened on Tuesday, the 13th December, when the first assembly was held. The new rooms, of which we have already given some particulars, have cost, we understand, about 14,000*l*., and have been erected by a number of shareholders, the shares being 100*l*. each; and, of course, only shareholders, or those introduced by them, will have the right of *entrée*. The building is perfectly plain in its exterior. The ball-room is 81 feet long, 40 feet wide, and 40 feet high. The ceiling only has yet been decorated; the state of the work not justifying the present decoration of the walls. The ceiling is in three compartments, each having a domical centre 25 feet in diameter, filled with human figures in low relief and arabesque ornaments. The groundwork is here of azure blue; the figures and ornaments being in light prismatic colours, relieved with gilding. The ornamental framing of the ceiling has a cream white, with colouring in the grounds, the ornaments and mouldings being gilt. Between the ceiling and the cornice there are twenty-four semicircular lunettes, containing each a group of figures playing musical instruments. These figures, which are in bold relief, are painted white, the ground behind being a rich blue; while the spandrils between are finished in maroon and gilt. At each end of the room, and in the centre opposite the orchestra, are mirrors nearly 20 feet high, in frames; beneath being divan seats, covered with crimson silk damask, with seats to correspond in other parts of the room. The floor has been laid with solid parquet flooring, by Messrs. Arrowsmith and Co., of New Bond-street, after a handsome design. The same manufacturers have laid the chancel floor of the new church of St. Peter, Bellsize-park, with this flooring, which has attracted much notice; and it has also been brought into use by them in several other churches throughout the country, as in St. Gregory's, Cheltenham; Ezrah Church, York; Mickleover Church, near Derby, &c.: it is said to be much liked by the clergymen, being warmer for the feet. The architects of the Assembly-rooms are Messrs. Mills & Murgatroyd; the general contractors, Messrs. D. Bellhouse and Son. The painting and decoration, as well as the furnishing, have been carried out under the direction of Mr. Crace, of London: the three principal gaseliers have been made by Messrs. Radcliffe, of Birmingham; the others being the production of Messrs. Perry & Verity, of London. Throughout the building are instances of the use of cast iron for purposes of ornamentation. Messrs. Edward T. Bellhouse & Co. were the sub-contractors for this department.

WELL-BORING.

AN artesian well, of large size, has been completed for the Woodcock-street baths, Birmingham. According to the local *Daily Post*, when the corporation advertised for tenders, the contract was taken by Mr. Greenley, a metropolitan well-borer. The diameter of the well was not specified; but, as Mr. Greenley had recently commenced working some much-improved machinery, he was anxious to show to what extent the old dimensions could be exceeded, and undertook the construction of the well for a sum much below what he believed it would cost him. The diameter fixed upon was the large one of 26 inches. The work was commenced in November, 1858, in the belief that it would be finished in three or four months, but the difficulties encountered were so great that the well was only completed a few days ago. More than one stratum of running sand was encountered; and, to pass through these, iron cylinders had to be sunk and fixed. But for the nature of Mr. Greenley's machinery the well would have proved a failure. The instrument now used in making artesian perforations is very different from the old machine employed in boring for coal, &c.,—a series of iron rods screwed together and forced down by repeated blows with a mallet. That was a costly and tedious operation. Mr. Greenley's machine, however, is simply an improvement upon an instrument which has been used in China for two or three thousand years. It consists of a very heavy bar of cast iron, armed at its lower end with a number of cutting chisels, and suspended by a rope, which is in connection with a steam-engine at the mouth of the well. As it is wrought up and down by the engine, the torsion of the rope gives a circular movement to the bar of iron sufficient to vary the position of the chisels at each stroke of the instrument. The apparatus of some well-borers has around the chisels a cylindrical chamber, which, by means of simple valves, receives and retains the abraded portions of the rock. This chamber, which would not hold many pints, had of course to be raised to the surface at short intervals for the purpose of being emptied of the *débris*, thus involving much loss of time. Mr. Greenley, however, performs this important operation in a very different way. He employs a cylinder eight or nine inches in diameter, having a piston fitted to it, so as to form a pump, with one valve at the piston and another at the bottom of the cylinder. When the pump sinks to the bottom of the well, the piston, by its own gravity, sinks also to the bottom; and, by suddenly reversing the engine and drawing up the sucker, not only is the crushed *débris* drawn up, but also pieces of rock six or eight inches in diameter. When the workmen came to the running sand, therefore, instead of bringing up a few quarts at a time, this pump enabled them to raise six or seven tons per hour. The sand, however, was not the only difficulty. Hard clays had to be cut through; and then, at a depth of 75 feet, the old red sandstone was reached. It proved to be as hard as Aberdeen granite, and infinitely worse than flint, because flint would crack and split, whereas this had to be ground as in a mortar. Though the contractor did not expect his machine would have such a crust as this to bite, he persevered month after month in the tedious work, and at length, having penetrated the sandstone to the depth of 145 feet, he reached the goal specified in his contract. Numerous water fissures were met with in the formation, and if Woodcock-street had not been 40 or 50 feet higher than Allison-street, the stream would have been

by this time leaping forth from the mouth of the well.

The machinery employed is said to be the invention of Mr. Allison, who had the superintendence of the work under Mr. Greenley.

FALL OF AN ARCH, FISHMARKET, NORWICH.

An inquest has been held in Norwich, before the city coroner, on the body of a workman, William Powley, who was killed by the fall of an arch in the new Fishmarket there. At an adjourned meeting on the 15th inst., Mr. M. D. Wyatt, who was examined, said,—Premising that the information I have received, with respect to the arch that has fallen, is correct,—that is, that it was in a very wet condition,—I consider that the striking of the centre prematurely while the arch was in that state was the cause of the arch falling in. If the mortar had been allowed to harden, I think there was no reason why the arch should have fallen. Considering the state of the arch, I attribute its fall solely to the removal of the centre whilst in that condition. The materials used are fully equal to the average class of materials of which that kind of arch is constructed. My attention was drawn to the part of the building which has been secured by iron rods and bars; and I attribute the necessity for these rods to the omission of the lintel, which should have been inserted over the window, and of the discharging arch which should have come over it. The omission of the lintel, primarily, was the fault of the builder.

By the Foreman.—The centres should have been struck gradually under any circumstances. If the arches had been built with cement, the centres might have been struck sooner; but even then they ought not to have been struck until the abutments were finished.

Cross-examined by Mr. Carlos Cooper.—These arches had been exposed to the weather very much. The mortar in its present condition appears to have but little lime in it, and certainly exhibits signs, from the interstices being open, of being very much washed, and must have stood a very hard chance of getting dry at all. The lime used, also, is slow-setting lime, and unless there was good reasonable protection, the mortar would not harden.

A Juror asked what proportion of sand would have been sufficient in the mortar?

Mr. Wyatt.—Two parts sand and one part lime?

The specification was referred to, and it appeared that it stipulated that the mortar should be composed of "*one* part well burned lime, and *three* parts of sharp clean sand, well mixed and worked together."

Mr. Wyatt said,—I stated that the proportion should be two parts of sand to one of lime; but of course, in cheaper work, a smaller proportion is used. That is a matter of economy. Some lime will take a great deal more sand. Supposing the sand is sharper, and of a better quality, it will do with less lime; so different quantities are used in different parts of the country; but the proportion usually employed in London is two parts to one.

Mr. Miller.—If you had been consulted, would you have passed the plans of this building?

Mr. Wyatt.—The building is not one of an expensive class, and I presume that economy was a great consideration. If money had been of no object, you would probably have made a handsomer and more durable building, by expending double the money; but I consider the building answers the purpose, and is fairly designed and built, and evidently with considerable attention to economy, which I presume was a great object.

Mr. Henry Robert Abraham (the architect engaged by the jury to inspect the building) said,—In the absence of violence or any specific cause unknown to me, I should say that the fall of the arch in question arose from a very unfortunate combination and complication of circumstances; certainly from no one individual circumstance. I had an excavation made at the north springing wall of the arch which had fallen. I found that the soil at the bottom was very wet, and of a compressible character, and likely to be altered and affected by saturation, and particularly if there were any motion in the water,—that is, if, from any large quantity of rain coming down, the water rapidly found a level and carried the sand away with it. I also found that there was no concrete foundation, which would have remedied such a condition, nor could I discover any drainage. The walling itself was of different heights and weights, and, therefore, the higher and heavier portion, and the more bulky portions—such as those which contained chimneys—would necessarily subside lower than the lighter portions, and I found unmistakeable signs of their having done so. I also found that the building had been erected partly on new and partly on old foundations, which, in itself, would almost inevitably cause fracture. I next examined the arches which had fallen, and I perhaps should render what I have to say better understood if I produce one of the bricks. [Portions of bricks produced.] I may say they are of as good a quality as is necessary for the work. The mortar is composed of rather a loamy sand, softer and less silica in it than in those sands used in the neighbourhood of the metropolis and elsewhere, and evidently of unequal quality and ill-made. The lime is not properly diffused through it: in some parts it has great tenacity, as may be seen by these bricks, while in others the bricks come out quite clean from it. With regard to the stability of the arches, it has always been my practice to avoid so close a proximity to danger in the rise of arches—considering what duty such arches have to do in a public thoroughfare—unless the arches were turned in cement, with a different character of brick, when, in point of fact, the character of the arch is lost in one large homogeneous structure, which becomes a floor rather than an arch. As to the walls, my opinion differs from that of Mr. Digby Wyatt. I always find that it is dangerous to carry up arches for floors simultaneously with the other work, and particularly where the walls are of different weight, and the foundations are not uniformly solid. I think the walls should be carried up to their heights, so that all the abutments should be at once perfect. They should then settle for a sufficient period, and then, when the arches are turned, you may turn them almost as flat as you please, if they are properly built. Now, I do not consider that these arches are properly built. I think that two rims, particularly with such materials, would not form a solid and safe arch; and I consider that all the arches in this building are insecure, unless they are bonded together. It is evident that the two rims have separated in this building. I think that is one of the combining causes of failure; and I feel it my duty to say that I believe every arch in this building is liable to fall if they have been constructed in the same way. I think that when the hot summer weather comes, and the water is out of the foundation, there will be further symptoms of failure in the building. There is one part of the building which I consider now to be so highly dangerous that I thought it my duty to beg that some immediate steps be taken to secure it.

The Coroner.—It has been said that it is not safe to strike a centre when the mortar is soft. Is it safe to strike a centre when the mortar is hard?

Mr. Abraham.—I am afraid I shall be considered to be propounding a different theory to that which other people hold. I always have my centres struck when the mortar is soft. I do not think the principle of an arch can otherwise be realised. I never allow the mortar to get hard: I ease the centre; because the principle of the arch is its squeezing itself into the mortar, so that if you allow the mortar to get hard, and then remove the centre, it is sure to drop, and fracture must occur, particularly if the arch is turned with two rims; but if you allow it to be squeezed by its own weight into its own mould, and keep it there, you have a perfect solid arch and equilibrium. This arch, I believe, has had its death-blow by some weight or other being placed on it—some knock which will never be known. I think the accident may fairly be attributed to a combination of circumstances, which could not very well have been avoided; and, therefore, I do not say that blame can fairly be said to attach to any one. I have seen a great many accidents in buildings, and I was indicted myself at the Old Bailey for manslaughter, though I was absent when the accident occurred. I noticed some iron rods put up at the corners of the building; and, if anything would throw down the walls, these rods would; for the brickwork will settle, while the upright rods will be rigid.

The Coroner having summed up, the jury retired, and, after more than half an hour's deliberation, returned the following verdict:—"That the deceased, William Powley, met his death by the accidental falling in of one of the cellar arches of the new Fishmarket, but the jury consider, from the evidence of eminent architects of London and builders in Norwich, that the buildings are in an unsafe condition, and require the immediate attention of the corporation in order to ensure the perfect safety of the public."*

* A fuller report will be found in the *Norfolk Chronicle* of last week.

CHURCH-BUILDING NEWS.

Shelsley Walsh.—The church at Shelsley Walsh, Worcestershire, has just been entirely restored from the designs of Mr. George Truefitt, architect. Lord Ward, Sir John Walsh, bart., M.P., Rev. D. Melville, Rev. W. Griffiths (the rector), Mr. Smith, Mr. Haywood, and several others, have liberally subscribed towards the work, which the local papers speak well of.

Blackpool.—The design for the new Union Chapel, Blackpool, executed by Mr. Robinson, of Burnley, has been decided upon as being best adapted to the requirements. The building will be of patent bricks with stone facings. The two principal entrances will be at the end fronting Abingdon-street. The interior arrangement comprises two galleries; the one opposite the pulpit in a half circle, corresponding with the seats beneath; and the organ-gallery at the west end over the vestries and vestibule. The chapel will hold about 600 persons. Arrangements are being made to begin the building early next spring.

Preston.—The new Congregational chapel, Grimshaw-street, has been opened. The chapel has been built at a cost of about 3,000*l.*, towards which over 2,200*l.* have been contributed. It will seat about 900 people. It is 79 feet long, and 47 feet 6 inches in breadth. The style of the front of the building is Early Decorated, and it is executed in Longridge stone walling, with wrought stone dressings. In the centre of the façade, under a four-light window, three doorways lead to the entrance corridor, at each end of which are the staircases to the galleries and entrances to the body of the chapel. The chapel is lighted by the large four-light arched window in front, filled in with tracery, and by ten two-light arched windows on each side of the building. The works have been executed from the designs of Messrs. Bellamy & Hardy, of Lincoln, by the following contractors:—Messrs. Cooper & Tullis, masonry and brickwork; W. Pye, carpentry; G. Pye, slating and flagging; Park, Low, & Co., plumbing, painting, and glazing; and E. Shaw, plasterer.

Naseby.—The *Doncaster Gazette* notices the re-opening of Naseby Church. Both externally and internally it has been entirely renovated, the chancel arch, part of south wall and clerestory, and western end of south aisle, being entirely rebuilt. The old masonry and design, however, have been adhered to. New tracery heads, and internal arches to the windows, new gable crosses, and new north doorway, and windows in porch, have been inserted, and all the stonework scraped and repaired where necessary. New open roofs of Baltic fir have taken the place of the old ceiling, and the aisles have also new roofs of the same material. New open seats of deal are arranged so as to give considerable accommodation for the poor. The proportions of the tower arch will also be displayed by the removal of the wall which blocks it up. The chancel roof has been panelled and ornamented with a few simple designs, in colour. When the tower was examined it was found so dilapidated and insecure that it was deemed necessary to pull it down and rebuild it on the old foundations, a crypt being constructed underneath it. There will be new floors of oak laid in it. It is intended to complete the spire to the height originally contemplated.

Newcastle-upon-Tyne.—The foundation-stone of Christ Church, Shieldfield, has been laid. The new edifice will be situated in Shieldfield-green, parish of All Saints, or between Henry-street and Albert-street, immediately contiguous to the schools known as the All Saints' Parochial Schools. The style adopted is the Early Decorated Gothic. In plan, it consists of nave and chancel, with north and south aisles to each, a vestry at the east end of the former, and a tower and spire at the west end of the latter aisle. At the west end of the church the deviation to the north-west has suggested to the architect the idea of projecting the end of the nave in advance of the north aisle, and the tower similarly in advance of the south aisle. The west end presents a varied outline, with the principal doorway under a crocketed canopy, and above it a five-light window, with tracery within a moulded arch. At the north-east corner is a porch, triangular in plan, to suit the obliquity of the ground, also enriched with canopies, niches, and carved foliage. The jambs of the doorways are intended to be filled with detached shafts of marble, or coloured stone. The interior dimensions are as follows:—Nave, 64 feet by 23 feet; north aisle, 52 feet by 10 feet; south aisle, 64 feet by 10 feet; chancel, 29 feet by 18 feet; chancel aisles, 29 feet by 13 feet. The piers will consist of clustered shafts with capitals of carved foliage

of the oak, ivy, thorn, maple, vine, &c.; and will support arches of moulded stone. The chancel arch will be similarly treated, and will be 30 feet high. The nave and chancel, and their aisles, will be covered with triple pointed roofs, and be lighted by three-light windows, with varied tracery. The church will afford accommodation for 500 worshippers; and its cost will be 3,250*l*. The architect is Mr. A. B. Higham, of Newcastle. The builder is Mr. Robson, also of Newcastle.

STAINED GLASS.

St. Mary Redcliff (Bristol).—A stained glass window has been lately placed in the north transept of the church of St. Mary Redcliff, in memory of Mr. William H. Wyld, alderman of this city, senior vestryman of the parish of St. Mary Redcliff; also of Mary, his wife, and four of their infant children. The window is of three lights, each light consists of two medallions containing figure subjects on a foliated background, with borders containing inscriptions referring to the subjects they enclose. The subjects illustrated in the four medallions of the two side lights are taken from the Lord's Prayer, viz., "Our Father which art in Heaven," "Hallowed be Thy Name," "Give us this Day our daily Bread," and "Deliver us from Evil." The whole of the Lord's Prayer is inscribed as a bordering round the two side lights. The centre light is arranged in a similar manner to the side ones. The subject of the lower medallion is "Our Saviour blessing little Children." The general design and arrangement of the window is by Mr. J. H. Hirst, architect; the working cartoons were prepared, and the figure subjects drawn, by Mr. Maycock, of Clifton. The execution of the stained-glass work was entrusted to Mr. Bell, of Bristol.

St. Mary's, Shrewsbury.—For a considerable time past, says the *Shrewsbury Chronicle*, the east window of St. Mary's has been undergoing enlargement, alterations, and improvements, under the direction of Mr. S. P. Smith, architect. The contractor was Mr. John Cross, builder, of this town, who completed the masonry of the window, the style being Gothic. The window originally contained the glass that adorned the chancel of old St. Chad's Church, having escaped the disaster which happened to the other part of that fabric, when it fell in 1788. The subject is the genealogy of Christ, from the root of Jesse. The patriarch occupies the lower portion of the present window, being depicted as reclining, in a gentle sleep, with his head resting upon an embroidered pillow, and supported on his right hand. From his loins the promised stem ascends upwards, each circling limb enclosing within its intersections a king or prophet immediately connected with the series from which the Saviour of the world, as the son of David, sprang. In the old window, altogether, there were forty-six figures. The new window, however, has been very considerably enlarged,—as much as 16 feet in height, the breadth being 25 feet. The entire height is about 35 feet. The replacement of the old glass, and the addition of new, were entrusted to Mr. David Evans; and he and his son, Mr. Charles Evans, according to the *Chronicle*, have performed their task with skill and taste. The additions, which are extensive, harmonize well with the old work. On the upper portion of the left compartment are the figures of St. Matthew, and Joseph, the husband of the Virgin; on the right, the Virgin and Child, and St. Luke. In the apex of the right side is a representation of the Nativity, and on the left the Baptism of Jesus. In the upper part of the entire window is the Crucifixion. The vine is continued through all the intersections of the window to the new additional figures.

Bicester Church.—A memorial window to the memory of the late Brevet-major Coker is placed in the west side of Bicester Church, opposite to the family vault and pew. The window is of the Early Decorated style, and has painted glass, by Mr. O'Connor, of London, with three scriptural designs. The two chief groups are Jesus rescuing Peter, and Peter baptizing Cornelius, and together they contain nine figures, surmounted with an angel bearing a scroll. Below the window, within the church, is a brass plate, containing the inscription.

All Saints', Southampton.—Stained-glass windows have now been placed in the chancel of this church. They were designed by Messrs. Guillaume & Co., of Southampton. The window on the right was the gift of the present mayor (Mr. F. Perkins) and Mrs. Perkins. It contains allegorical representations of St. Matthew and St. John; the whole surrounded with a border in blue and gold. The window on the left is somewhat similar to the former in design, except the colour of the body glass, the one on the right being of a deep ruby, and the other of an orange. The allegorical representations of the latter are those of St. Luke and St. Mark. The iron frames and wire-work for protection from stones were executed by Messrs. Kent & Dain, of Southampton. The glass was from Messrs. Chance, Brothers, of Birmingham, and the glazing was done by Mr. Buchan.

Christ Church, Yardley.—The east window of Christ Church, Yardley Wood, has been filled with stained glass, as a memorial of the late Miss Taylor, of Moor-green, Moseley. The window, which was executed by Mr. Holland, of Warwick, is of Early English character, and designed with a view to illustrate objects to which Miss Taylor devoted her time and means. The illustrations consist of medallions piercing a ground of scroll pattern, and are drawn from Mark x. 13, and Matthew xxv. 35, 36.

Llanfyllin Parish Church.—A stained-glass window has just been placed in the parish church here. The subject selected is St. John the Evangelist, with his usual emblems of an eagle at his feet and a chalice in his hand with a serpent issuing out of it. The window is the gift of a townsman, Mr. John Pugh, solicitor. The whole was designed and executed by Messrs. Smith & Taylor, of Whitechapel.

Chester Cathedral.—For some time past operations have been going on in the Lady Chapel which will materially contribute to beautify it. A new painted window has just been put into the east end, on which various incidents in the life of our Saviour are painted, by Mr. Wailes, of Newcastle. The window is in five lights, and is lancet-pointed. The incidents are twenty-two in number, in addition to which there are two medallions. The stonework of the window is Early English in style.

St. Thomas's, Birmingham.—A stained-glass window has been placed in the east end of this church. The work has been designed and executed by Messrs. Gibbs, of London. The subject chosen for illustration is that portion of the Gospel narrative in which the apostle Thomas—all his incredulity having vanished at the sight of his risen Master—utters the sublime declaration, "My Lord and my God." Peter and John, with two other of the apostles, form a group in the background. The figure of the Saviour is 7 feet in height, and draped in a purple robe, with a flowered border, while Thomas is clad in a blue under-dress and ruby-coloured mantle. The size of the window is about 18 feet by 6 feet. The artists have been required to occupy a considerable space with ornamental work.

Parish Church, Edgbaston.—The three painted windows lately erected in this church, are designed to correspond with the period of the building, namely the fifteenth century. They contain three principal events in the history of our Lord,—His Crucifixion, Resurrection, and Ascension. The centre window, the stone-work of which was designed by the architect, Mr. Fiddian, with reference to the subject, consists of two lights, and a large circular piece of tracery. In the upper compartment is the figure of our Lord ascending in glory amidst adoring angels; while, in the two lower compartments, kneeling around the mount, are the Apostles looking up towards their departing Master. These windows were executed by Messrs. Hardman, of Birmingham, after designs by Mr. Powell, of the same firm.

Manchester Cathedral.—A large stained-glass window has just been placed at the east end of Manchester Cathedral, above the Communion. The window consists of seven principal lights, with canopies and tracery, the subjects being taken from the life of the Saviour, and comprising "The Agony in the Garden," the "Bearing of the Cross," "The Crucifixion," "The Resurrection," &c. The three centre lights form one subject, "The Crucifixion," with St. John and the centurion on the right, Mary Magdalen in the centre, and the three other women on the left. Above the principal lights are fourteen angels, two above each light, who bear emblems typical of the passion of our Lord. The tracery above is filled with foliage and flowers, with the lamb and flag at the top. Messrs. Hardman, of Birmingham, designed the window. It is the gift of a gentleman who is at present one of the visitors of the Cathedral School, and who was formerly a teacher, and previously to that a scholar. The owner of the Chetham Chapel, beneath this stained-glass window, intends, says the *Courier*, to complete it in harmony with a general design, which, when completed, will make the Manchester Cathedral one of the most richly adorned of our ecclesiastical structures.

Skerton Church (Ulverston).—A window of painted glass has just been erected in the east end of Skerton Church. The window is of the Early English period, and consists of three lights. In the centre opening, which is much longer and wider than the sides, are introduced the three principal incidents in our Saviour's life, viz., the Nativity, Crucifixion, and Ascension; and in the side openings are the four Evangelists. The window has been designed and executed by Mr. F. Burrow, of Sandside, Milnthorpe.

St. Mary's, Limerick.—The Stafford Memorial Committee have put up a stained glass east window in St. Mary's Cathedral, Limerick, as a memorial to the late Augustus O'Brien Stafford, M.P. It was designed by Mr. William Slater, architect, and the stained glass was executed by Messrs. Clayton & Bell. The committee had to replace all the stonework of the window, and to put a new roof over the chancel, the old roof being in an advanced state of decay; and they are anxious to finish the reredos and chancel floor. The works done have fortunately led to an effort to extend the restorations, and Mr. Slater has been commissioned to prepare a design for the purpose.

PROVINCIAL NEWS.

Great Bridge (Staffordshire).—The chief stone of the new Wesleyan schools here has been recently laid. They comprise boys and girls' school, 49 feet by 22 feet, together with three class-rooms, each 18 feet by 15 feet. There is a detached residence for the master. The buildings are in red bricks, relieved with blue and white bricks, in strings and patterns. The elevation is plain Gothic in character. The main roofs are constructed with hammerbeams, and ceiled on the underside of the rafters. The works are being carried out under the superintendence of Mr. Edward Holmes; the builders being Messrs. Cox and Son.

Seaham.—The foundation-stone of new blast furnaces has been laid at Seaham by the Marchioness of Londonderry. The furnaces are to be erected by her ladyship on a piece of ground lying about a mile south of Seaham Harbour, called Nose's Point. The plan comprehends four blast furnaces, 120 coke ovens, and calcining kilns for the iron stone. The works will extend over twenty acres, and are expected to be completed in ten months, when between 200 and 300 men will be employed. The ore will be obtained from Cleveland, her ladyship having acquired a large tract of ground at Boulby, where it will be shipped and brought to Seaham. After the laying of the stone about 100 gentlemen adjourned to a luncheon, at which the marchioness presided, and where she made a speech and proposed a toast. It is believed that when these furnaces are at work about 80,000*l*. a-year will be expended in connection with them for the advantage of the district.

THE ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.

THE only notice I have received of the proceedings of the "Architectural Photographic Association" has been through your columns: whether or not those gentlemen who undertake the duties of local honorary secretaries should not have been consulted in some way or other, I leave your readers to judge.

I am, however, glad to find that the Association is re-organized; and I only trouble you with this note to point out where I think an improvement might be made in the mode of procuring photographs, that will be required for the subscribers next year.

I think the best ones that were shown at the last exhibition were those of Tintern Abbey, by Bedford; and I would strongly advise that arrangements should, if practicable, be made with that well-known artist, to photograph some of our cathedrals each year; not merely purchasing the negatives, but contracting for the positives direct from Mr. Bedford, who will then do full justice in printing from the negatives for his own credit's sake.

By this plan we should have no complaints as to inferior positives, which should be rejected by a few subscribers who might be selected as inspectors, from their knowledge of practical photography; for none else could judge of the probability of a photograph fading or otherwise.

I know nothing of Mr. Bedford, except from his excellent photographs, which, I think, for beauty of execution, and the judgment shown in the selection of his views, are second to none:

doubtless, other parties might also be found who would agree to a similar arrangement; and I think you will agree with me, that there are few subscribers who would not much prefer a uniformly printed set of photographs, say 12 inches by 10 inches, from such a glorious building as Lincoln Cathedral (not to mention others), than a mixture of subjects from all countries, of all sizes, colours, and qualities.

If this suggestion were tried, even to a limited extent, I think the choice shown by subscribers at the first exhibition they were produced would convince the new committee of the policy of the plan.

A Photographer and a Local Honorary Secretary of the Association.

DAGENHAM BREACH.

In a recent number, page 805, you say Dagenham Breach may have been formed as the name suggests. Perhaps you are not aware of the interesting and scarce book, "An Account of the Stopping of Daggenham Breach, &c., by Captain John Perry, London, 1721," "which (Breach) happened by the blowing up of a sluice in the levels of Daggenham Beam, not three and a half years since," &c. After many unsuccessful attempts, Captain Perry succeeded in stopping the breach, which, by the scouring of the tide in and out of Daggenham Levels, had got to a great size. At last, after spending upwards of 25,000*l.* (in five years), Captain Perry attained his object.

You also quote the *Engineer*, that the London and Birmingham Railway was the first of any magnitude let by contract. It may have been the first railway; but poor Captain Perry took his job by contract, and found out that contracting is not always the way to wealth. Having lost much money by it, and having taken the work from trustees, appointed by an Act of Parliament to stop the Breach, he hopes (in his book) the trustees will apply again to Parliament to reimburse him his losses.

Such a request now would be read without much effect at a railway shareholders' meeting! The way in which Perry succeeded was very ingenious. W.

"HANS BLOOME."

Will you please inform Mr. Henry Austen that an edition of "Hans Bloome" was published in London in 1635, "printed for William and Robert Peake, at their house, near Holborne Conduit." The title-page says it was "translated out of Latine into English, by J. T.——." The editor's name was Hans Wovtneil, and he dedicates the book to his "especiall and kind friend M. John Land, merchant, and true favourer of art." In his address to the reader, he says he has chosen a patron that hath himself, to his knowledge, intended (if this book be acceptable), to set forth the works of "Sebastian Serly and Albertus Duree." From this it is probable there was a much earlier edition of "Hans Bloome," for the noble volume of the five books of Serlio, properly illustrated with wood engravings, many of which would not disgrace the present day, was published in London, 1611. My copy wants the title-page, and the last page of the fifth chapter. The title-page of the second chapter is as follows:—"The second book of Architecture, made by Sebastian Serly. Translated out of Italian into Dutch, and out of Dutch into English. Printed for Robert Peake, and are to be sold at his shop, near Holborne Conduit, next to the Sunne Taverne, anno Do. 1611;" and the tail piece, that it was published at the charge of Robert Peake, for the benefit of the English nation. Albert Durer's work was probably the one on perspective, published at Frankfort in 1546. This I believe was never translated into English. C. J. R.

THE VENTILATION OF THE ARCHITECTS' INSTITUTE.

When admiring the other day the fittings and arrangement of the interior portions of this building, I regretted to notice the evident want of ventilation, particularly in the staircases and lobby. A damp, deadly smell seemed to pervade the atmosphere, which cannot be wholesome. Having noticed the same effect in several of the large houses built about the same date as this, I thought that, by mentioning the circumstance, connected with a place in which so many professional men congregate, some remedy might be suggested for the imperfection.

Is the evil caused by damp and ill-ventilation of the underground parts, or by the want of attention to the opening of the windows? It is to be noticed that, while the glazing of the meeting-room is well managed, that of the staircase leading to the rooms does not admit of being opened.

In the library there is an interesting autograph of Sir Christopher Wren. It is a note on the back of an old print, mentioning the particulars of its purchase by the famous architect. This is carefully glazed on each side; but, notwithstanding, the ink is so much faded, owing probably to the absorbent nature of the print paper, that the writing is not easy to read. It would be well worth while to make a correct copy of this before it gets more indistinct, and place it in some part of the frame. An Artist.

THE CHURCH OF CLEY-NEXT-THE-SEA.

Sir,—A statement signed "A. B." having appeared in the *Builder* of the 10th instant, with reference to the above church, I feel it incumbent upon me to notice it for the following reasons:—Because the information it makes public is false. Because it involves an unjust reflection upon a worthy and aspiring local architect. And because it has a tendency to injure the project which I have at heart, viz., the complete though gradual restoration of my magnificent church.

"A. B." states that the new roof over the nave was carried out under the directions of Mr. F. Codd, of the Adelphi, but that the recent reseating of the nave has been done "without the intervention of any regular architect," and consequently in a "cheap and unsatisfactory manner."

Now, as regards the reseating, this is utterly false; for, not only that part of the recent restoration, but the scraping, cleaning, paving, &c., have been carried out under the constant and careful supervision of a local architect, and in a manner corresponding with the architecture of the edifice, creditable to the contractor, and satisfactory to the parishioners.

"A. B.'s" allusion to the roof is certainly an unfortunate one, as it happens to be the only part of the restoration which has been objected to.

Nearly 600*l.* have of late been expended upon the church; and I beg to assure those friends at a distance, especially C. Buxton, esq., M. P., Sir Thomas Fowel Buxton, Lord Calthorpe, &c., who have munificently contributed to the restoration fund, that their money has been properly laid out. And in taking leave of "A. B." I would admonish him for the future to back his statements by his proper name and address, and pay more regard to truth and charity.

I trust to your sense of fairness for the insertion of the above in your next number.

Thomas J. Bewsher, Rector of Cley-next-the-Sea, Norfolk.

THE LATE MR. VERELST, ARCHITECT.

We hear with great regret of the death of Mr. Charles Verelst (formerly Mr. Reed), of Aston Hall, near Rotherham, which took place suddenly on the 13th inst., at his residence in Birkenhead. Mr. Verelst came into possession of the Aston estates in 1851, but, in consequence of the heavy settlements with which they were encumbered, he has not until latterly derived much benefit from them. He was the architect of St. John's Church, Grange-lane; of the Manor-house, Claughton; and of many other buildings in Liverpool and the country round. The Liverpool Architectural and Archæological Society was especially indebted to him in its earlier days. At the usual meeting of that society held last week, Mr. H. P. Horner, who was in the chair, submitted the following resolution, agreed to at a meeting of the council of the society, and it was at once passed *sub silentio*:—

That the president be requested to convey to Mrs. Verelst the respectful and heartfelt condolence of this society under the sudden and irreparable bereavement which has befallen herself and her family. This meeting desire also to record their deep regret for the loss which the society has sustained by the removal of one who shared in its foundation, who manifested throughout its whole subsequent progress so constant and active an interest in its welfare, who was an ornament to his profession, a cordial friend, a cultivated, courteous, and upright man.

The meeting then adjourned without transacting further business.

TRADE UNIONS.

THEIR USES AND ABUSES.

This question formed the subject of a long debate at the Maidstone Corn Exchange, on Wednesday evening in last week, between C. Buxton, Esq., M.P., who had invited the discussion, on the one side, and Mr. Gant Facey, an operative connected with the building trade, on the other. The body of the hall was crowded, chiefly by working men, and the platform was occupied by many of the leading tradesmen of the town. The proceedings, which lasted three hours, were throughout of a very quiet and orderly character. The Hon. Mr. Denman, M.P. for Tiverton, and of the Home Circuit, was appointed by Mr. Buxton as his chairman, or rather introducer: Mr. Sturgeon, also a member of the bar, acted in the same capacity for Mr. Facey; while Mr. Shackell officiated as referee between the rival parties.

Mr. Buxton, after remarking that he had devoted a great deal of time and attention to the study of this question, proceeded to observe that he was quite ready to admit that these trade unions were in many cases doing considerable good; and that, if they were managed wisely and temperately, with a due regard to the independence of the individual artisan, they would become a source of strength and well-being to the working men of England. It was a good thing that they should be knit together by as many ties as possible; and, no doubt, there were many masters of a grasping, tyrannical disposition, who, if they dared do so, would not scruple to trample on those beneath them, withhold their due from them, and, in fine, treat them not as men, but as beasts of burden. It was well for the working men to present a serried phalanx against oppression of this kind; but the main good resulting from these trade unions was that they were calculated to promote habits of frugality and forethought. At the same time, even in this point of view, the attention of those who belonged to unions ought to be called to the evils that might arise if great caution were not exercised. It was a question whether it would not be more judicious for the working man to put his money into the savings' bank, where the cost of management was nothing, and he received interest on his principal sufficient to double it in fifty years, if allowed to remain undisturbed. He would next consider whether the natural freedom of the working man was not too much trenched upon by the minute and stringent regulations of the trade unions. And in addition to the printed rules, which in themselves were a heavy encumbrance on the working man, the district committees were in many instances empowered to add by-laws which were not printed, and which were often more arbitrary and mischievous than those made public. For instance, there was no rule in any trade society against the introduction of machinery, and yet numberless were the strikes which had taken place from that cause. In another case, he wished to apprentice a lad in whom he was interested to a particular trade, but was informed that no apprentices were allowed except the sons of mechanics. There was no regulation to that effect in the printed rules, but he had since been shown it in the private code. He would admit that in this respect several of the unions were under wise government, and had avoided the mistakes into which some others had fallen; and they afforded good reason for hoping that others might follow their example. By the regulations of the Amalgamated Engineers' Society, rather a fine specimen of its class, its members were liable to be fined for no less than sixty-seven different offences. An able mason in London who took less than 5*s.* 6*d.* a day, was deemed a "black," and was subject to a penalty of 5*l.* He had with him a printed list of "blacks," not negro slaves, but Englishmen who had infringed the rules of the unions. From what he had stated, he thought they would agree with him that, under the existing rules of many of the trade societies, the working man was not able to regulate his actions according to his own pleasure, but that for many things, in themselves lawful and right, he was exposed to punishment, rendered the more severe by the fact that the committees of the trade unions had it in their power to refuse the benefits of the society to any offending member till he gave in his submission. In conclusion, the hon. gentleman referred to the evils which a strike in any particular branch of trade incidentally inflicted upon large numbers of others who were not concerned in the question at issue. For instance, the number of men recognised by the United Trade Conference on strike in August last was 7,000, but the number actually thrown out of work was 40,000. So in the case with the Lancashire spinners, the operatives who struck were not a tenth of those deprived of the means of earning their bread; while, in another case, through the striking of 600 men, 8,000 persons lost their employment, and were sunk in universal and intense suffering.

Mr. Facey commenced by observing that he stood there in a responsible position to argue in favour of those legal and moral institutions which the working classes had established for themselves for the purpose of providing for future necessities in case of accident, sickness, old age, and death. The hon. gentleman in thus coming forward to discuss this question had set an example which might well be followed by others of his class. Proceeding to review the objections of Mr. Buxton in detail, the speaker observed that with regard to the working man placing his savings in a bank instead of contributing to a society, the hon. member ought to have known that the small amount a man could individually put by, taking into account casualities and times when he was out of work, would not be sufficient to provide the same amount of benefit that was conferred by associated societies. The hon. gentleman had repeated the calumnies, unwittingly he was sure, which had been circulated as to the power exercised over the members of the unions by the trade committees. The fact was, no more power was delegated to them than to the board of directors of any association. Of course it was necessary that some body should have the power to settle petty disputes which arose; but in case of any alteration of the rules or of the disposal of the funds, the regulations of the society necessitated the committee to call a meeting of the general body, so that every member had a voice in the consideration of the question under discussion. A general meeting was also held every year to revise the rules; and a special meeting might be convened on the requisition of seven members, at which a committee could be appointed for the consideration of the particular subject under consideration: so that in this respect he thought they would agree with him, that no undue power was possessed by the committee. It was impossible that such societies could be regulated without rules and restrictions, or even fines. To say that the trade unions exercised a despotism was not true, seeing that those who belonged to them were parties to those rules which were binding on the whole. He defied Mr. Buxton or any one else to produce those secret rules to which he had referred. That was an old invention which had travelled down from Adam Smith, in all its nakedness, till Sidney Smith invested it with ten thousand more horrors. As to piece-work, there was no rule prohibiting it, though in the carpenters' society its avoidance was advised. And it was for this reason—that there was no set scale of prices for different descriptions of work in the carpenters' and joiners' trades. The employer would seek to take advantage of the necessities and jealousies of his workmen, and compel them to accept such prices as he chose to offer; and therefore it was but natural that the men should endeavour to stave off piecework. But he might say that if a certain number of employers would consent to meet an equal number of working men, with an articled surveyor on each side, and a surveyor from the Board of Works as referee, to agree to a scale of prices which would be fair to both parties, the men would then be willing to accept piece-work, but until that was done they dare not do so. Then Mr. Buxton said that trade societies tended to keep the skilled workman down to the level of the unskilful. Why, what nonsense! The rules only referred to the minimum rate of wages, but did not confine the amount. The men were glad to see their more skilled fellow workmen obtain

something beyond the bare pittance usually given by the masters; and he himself had obtained 6d. and 1s. a day more than others who had less skill in manipulation. It was said that the bricklayers objected to labourers laying the bricks for walls. Why, he should think the public ought to be obliged to them for doing so. As much skill was required in the construction of a wall as of a four or six-panel door. The hon. gentleman had alluded to the number of men on strike. His time was short, and he could not then fully show that it was no strike, but a lock-out on the part of the masters. The employers were determined not to listen to the representations of their workmen; and, when a deputation waited upon the masters on a moral and legal mission, namely, that of setting forth the demands of themselves and their fellows,—they were immediately discharged. Then it was that the men at Trollope's threw down their tools. The fact was, the employers of London wished to get all the profit they could out of the working man, but the latter had always a consideration for his master.

Mr. Buxton again addressed the meeting. He proceeded to consider the effect of strikes. Experience had shown that even in those cases in which strikes were successful, the result was ruin to the employers as well as to the workmen. Strikes had also a stimulating effect in the production of new machines, though for his own part he considered that to be a result not to be regretted, as he believed the effect of machinery was to increase the demand for labour. Next turning to the consideration of the misery and distress produced by unsuccessful strikes, he selected the case of the Preston spinners, who struck in 1854. The sum lost in wages by the operatives was 250,000*l.*: the capital of the matters was greatly shrunk; while the shopkeepers and others were almost ruined. Such were the terrible results of one of the best managed and best supported strikes that ever took place. The leader of the movement was Mr. Cowell, an operative, a man of great ability and high character, who was regarded with respect by both sides; and this same individual, at the recent meeting of the Social Science Association at Bradford, publicly stated that so dreadful were the miseries which he had seen produced by a strike, that he would never recommend one under any circumstances during his life. Looking at the heart-breaking consequences to the working men themselves, from such movements, one cannot but ask oneself whether it would not have been rather to their help than to their hindrance to have signed the "declaration," and so pledged themselves to abstain from such ill-fated endeavours to interfere, I will not say with their employers, but with the natural law by which the rate of wages is governed. Nor can I blame the masters for what, after all, was a defensive movement. At the same time, I must candidly confess, that, seeing what intense bitterness the "document" has called forth—seeing how deeply the artisans feel that in signing it they would barter away their natural rights and their natural freedom (a feeling we must all admire)—seeing this, I must confess my doubt whether the true wisdom of the masters would not have been to give way. The good effects that might have come had the men taken the "declaration" willingly, can, I fear, be hardly looked for when submission is wrung from them. I think Lord St. Leonards' proposal, which is almost one with that of the masons, would afford the masters graceful escape from a difficult and dangerous position. And although they may think their victory won, yet it might be well for them, and for the workmen too, that the question should be finally settled by treaty rather than by triumph. My views have become somewhat modified on this point by seeing more clearly what a thorough English feeling of independence lies at the root of the men's unwillingness to accept the "declaration." The working men of England might attain to an independence, freedom, and dignity such as the world never saw before, but they might depend on it that the way thereto lay in frugality and self-denial. Mr. Facey had said that no one had a right to charge trades' unions with being harsh, seeing that they were an exhibition of the working of universal suffrage. That might be so; but did Mr. Facey say that a majority could never be guilty of injustice? He had cited a number of rules which struck him as being harsh, and all he asked was that the attention of the working men might be directed to the subject with the view of seeing whether too much restriction was not imposed on the independence of their brethren. No doubt if working men associated together there must be some kind of punishment for a breach of faith. His opponent had denied that there were any secret rules. He forgot apparently that he (Mr. Buxton) cited two distinct instances of that kind. With regard to bricklayers, notwithstanding what Mr. Facey said about houses falling down, he maintained that the prohibition in that case was founded on the principle of protection, and distinctly opposed to that free-trade policy from which England had derived such enormous advantage. He believed that in the monopolising tendency of the trade unions they had the old protective spirit doing its utmost to interfere with the laws of nature, and for that reason among others he anxiously desired that the working men of this country might be induced to revise the system.

Mr. Facey then replied. The masters, he observed, had societies to regulate the price of material, and the working men had just the same right to apprise their labour; and, if employers would not give what they considered it worth, they had a right to say, "Then you shall not have it." The average duration of the employment of the building trades in London did not exceed seven months in the year, and their average earnings were about 18s. a-week. Moreover, they had to keep up an appearance, There was such an aristocracy of sight now among masters, that corduroys and fustian jackets were entirely out of the question. He knew the evil of strikes as well as any one; but he did not say to men on that account, "Give up the power of striking." As well might nations be advised to give up the power of making war. He did not stand there to advocate strikes as a rule, but to advocate them as a last resort for the working classes. There had been many strikes which had resulted in an advance of wages, and consequently in the elevation of the condition of the working classes, and in an increased circulation of money among the shopkeeping classes. If wages were raised in this country, the result was to give an increased command of the necessaries and comforts of life to the working classes, and to diminish the need of a poor law. As regarded machinery, he admitted that the opposition to its introduction was senseless, and believed machinery would ultimately work out the emancipation of the working classes. Until employers gave up their own associations, he should continue to recommend his brethren to unite for mutual protection.

Mr. Shackell (the referee) said the gentlemen around him had agreed to submit three questions for the consideration and decision of the meeting. He then put the three questions successively. The first was, "Are trades' unions a benefit to the working classes or not?" The affirmative was carried by a majority of about ten to one. The next question was, "Are strikes beneficial or not?" It was met by loud cries of "No, no," and "Only as a last resource;" and when it was put a very large majority of hands was held up for the negative. The last question was, "Should the master builders' declaration be approved or condemned?" On the show of hands the condemnation of the document was all but unanimous, and loud groans were directed against it.

On the motion of Mr. Potter, seconded by Mr. Noble, thanks were unanimously voted to Mr. Buxton for the course he had pursued in bringing about the discussion, and for the manner in which he had treated the question that evening.

On the motion of Mr. Buxton, M.P., seconded by Mr. Denman, M.P., a similar compliment was paid to Mr. Facey; and, thanks having been subsequently accorded to the two chairmen and the referee, the meeting separated.

We have received a reply from the secretary of the Conference to the note from a "Master Builder" in our last, asserting that the "Master Builder" has misquoted him. This our readers can judge of for themselves, having the original statement before them; and, as Mr. Potter simply reiterates assertions he has already made several times in our pages, and we have refused to insert three or four letters in reply to his previous communications, we do not think it necessary to print this.

BENEFIT SOCIETIES.

A CASE at Marlborough-street has recently excited some interest. The Operative Masons' Benefit Society, in the person of their secretary or president, Robert Fairburn, of 8, Howley-place, Belvedere-road, was the defendant, on the summoned complaint of Robert Gilmore Watt, who had been expelled from future participation in the benefits, on the 15th ult., on the ground that he had been found to be a member of another society, contrary to the express stipulation of Rule 1 of the said "Operative Masons' Benefit Society."

The complainant's case was that, as a working mason, he had joined the society on the 14th of February last, regularly contributing the required periodical payment. That on the 15th of September he declared on the sick-fund, producing, in proof of sickness, a medical certificate, from which time till the 11th of November he received the weekly allowance the rules of the society entitled him to. Being on that day summoned before the managing committee, he attended on the 15th, when certain objections were made to his continuing a member, only one of which, however, was held to be valid against him, and declared to be an infraction of their first rule, which set forth that no member of that society could be at the same time a member of any other benefit society. It was also objected, that he, besides receiving aid from the General Lock-out Fund, was a member of "The Friendly Stonemasons' Burial Society;" and it was alleged that by each of these facts he had become ineligible for the "Operative Masons' Society," and his name was there and then scratched from the list of members. In the first place, the legal gentleman for the complainant contended that whatever sum he had received as a locked-out workman, was granted not by right of claim but simply by favour; and, in the second, that the society was called a trade society, paying out only in the event of death or incapacitating accident; and these were the points upon which the magistrate was now called to adjudicate.

We print the judgment of the magistrate, after hearing evidence:—

Mr. Bingham said he had taken very great pains in the matter, and had, since the last occasion, looked over the rules of the two societies very carefully. The complainant, Watt, in September, 1858, was elected a member of the Operative Masons' Benefit Society, the intent and meaning of which society is, by its first rule, "to raise and secure a fund for the mutual relief of its members in sickness, infirmity, and old age, and for decently burying its members and their wives;" and by that rule it is declared "that no one, while a member of that society, must be a member of any other benefit society, enrolled or not enrolled." The contribution paid by a member is 2s. 9d. a-month (6¾d. a-week), and the allowance to a sick member varies from 20s. to 12s. per week, according to the state of the society's funds; for the death of a member, 12*l.* is allowed for funeral expenses, and on the death of the wife of a member, 8*l.* In September and October, 1859, Watt claimed and received allowance as a sick member. In November that allowance was stopped, and he was expelled from the society, on the allegation that he belonged to another benefit society. Watt admits that he belongs, and for many years has belonged, to another society, called the Operative Stone Masons' Friendly Society, but he contends that that society is not a benefit society within the meaning of the first rule of the Operative Masons' Benefit Society. Whether it be so or not will best be seen in the rules of the Operative Stonemasons' Society. By its first rule the objects of this society are stated to be "to mutually support each other while in seach of employment, and also in case of sickness or accident, and for the interment of deceased members, as also to regulate the price and lessen the hours of labour." The society consisted, in January, 1859, of 148 lodges, dispersed over most parts of England and Wales; and the government of the whole, including virtual control in the matter of strikes, is placed in the hands of eleven members, elected periodically by the central lodge, and called "The Central Committee"—(for which see sec. 4 of the rules, class 5). By rule 10 (class 2), it is laid down—"Working over-time, tending to our general injury by keeping members out of employment, shall be abolished, except in case of accident or necessity. Where members persist in working over-time, in opposition to the lodge of which they are members, they shall be fined at the discretion of such lodge. It is requested that lodges harassed by piecework or sub-contracting do apply at a reasonable time for a grant to abolish it. Where sub-contracting or piece-work is abolished, 'such' is binding with the society." By rule 3 (class 5), members may strike if any employer attempts to introduce piece-work where it has been abolished (that is abolished by the society). By rule 11 (class 2), the lodge of which they are members shall decide the amount of wages of those who through age or infirmity are unable to earn the current amount. By rule 8 (class 5), any member opposing another while resisting infringements on the part of an employer shall be fined 3*l.* And by rule 23 (class 1), an annual revised black list shall be printed, showing the names of those who have worked in opposition to strikes or otherwise. If these were the only objects of this society, by what name soever it might be designated, it could never, correctly, be styled a benefit society; but along with rules the object of which is to regulate the rate of wages by constraint of members and workmen in general, there are provisions for the support of sick and injured members, and for the decent interment of members and their wives, not to be distinguished in principle, and scarcely in details, from the provisions for the same purpose which are the main objects of the other (the Operative Masons' Benefit) society. It is true the members of the Stonemasons' Society are divided into two classes,—those who subscribe to the "trade fund only," and those who subscribe to the "trade and sick fund,"—that the subscription to the trade fund only is 4d. a-week, and the subscription to both funds together 7½d.; and it is proved that Watt was a subscriber to the trade fund only. But this subscription entitled him, if disabled "by any accidental cause, by paralytic stroke or eruption (meaning rupture) of bloodvessels, while earning his living," to receive 100*l.* as also 12*l.* for the funeral of himself, and 6*l.* for that of his wife. When the members of a society (called a benefit society), established for the support of sick members and the expenses of interment, make it a condition that no member shall belong to any other benefit society, their clear meaning is, that he shall not belong to any other society which proposes and effects the same purposes, whether separately or in conjunction with other purposes; whether styled benefit, or friendly, or trade society; whether enrolled or not enrolled; whether legal or illegal. The complainant Watt, one of such members, is also member of another society, from which he can obtain the expenses of interment, and 100*l.* upon breaking a limb or bloodvessel, or being struck with paralysis while earning his living. He has not availed himself of all the benefits offered by that other society; but, as to the class to which he has confined himself, it is clearly a benefit society within the meaning of the first rule of the Operative Masons' Benefit Society; and my judgment, must, therefore, be for the defendant. It has been asserted that the defendant's society consented to the election of the complainant, knowing that he was a member of the other society. The fact is disputed, but I consider it immaterial; for the society is a fluctuating body, and any single member may at any time insist on putting the rules in force. It is due to Watt (the complainant) to say that he leaves this court exempt from any imputations of deceit, or wrong, or evasion, on entering the defendant's society. When he declared, as he must have done, that he belonged to no other benefit society, I make no doubt that he believed the "Trade Fund Class" of the Stonemasons' Friendly Society not to be a benefit society.

Books Received.

"*The British Almanac of the Society for the Diffusion of Useful Knowledge, for the year of our Lord* 1860, *being Bissextile or Leap Year.*" 12mo., pp. 96.

"*Companion to the Almanac; or, Year-Book of General Information for* 1860." 12mo., pp. iv.; 264. London: Knight & Co.

THE Companion to the Almanac, just published contains like the previous number, several well-timed and ably-written articles,—in addition to the usual chronicle of legislation and statistics, and the article on Architecture and Public Improvements. Mr. Charles Knight's name is appended to an article on "The Necessity for Elementary Instruction in Political Economy," and his initials to one entitled "The National Debt: how it grew." In the latter, the amounts of the debt and interest in each year, beginning 1691 in the time of William and Mary, down to 1859, having been given, it is shown in a concluding table, that in the number of years, which were eighty-two of War and eighty-six of Peace, the debt increased from somewhat more than three millions, to 805,078,554*l.* at the present time—the decrease in the years of peace being only 81,795,136*l.* Without borrowing, the vast expenditure from 1793 to 1815, could not have been borne: on the other hand, a National Debt may be "a bad master if its aid be habitually invoked." Still, it is shown that although the interest has increased eight millions since the beginning of the century, the vast increase of capital and population in the same period makes payment from each individual considerably less

in 1859 than in 1801. The other article of which the title has been given, could not fail to be interesting and valuable. Those who are acquainted with the growth of questions of capital and labour during the last quarter of a century, will have a lively recollection of a little book entitled "The Results of Machinery," which had an extensive sale at a period of national alarm, and was followed by a tract called "Capital and Labour." These two parts, having been meanwhile incorporated under the latter title in Knight's Shilling Series, appeared with additions, in 1855, as the work, "Knowledge is Power." On the score of authorship of these productions, as otherwise, there is no one at the present juncture whose services to the working classes give him better claim to be listened to, than the author of the article in the "Companion." Mr. Knight regards all the forms of combination, whether as "against the aggressive selfishness of capital," or of monopolies by individuals or corporations, as a league of producers against consumers, sure in the end to fail. Whilst the struggle goes on, the real capital is unimpaired, or is only diverted. But Mr. Knight does not examine into the contingency of its diversion to foreign countries. He shows, however, that increase in the capital of the community of late years, has been the occasion of increased capital employed in building; and which has at the same time, in spite of the introduction of machinery, increased the number of the employed,—and without diminution in their rate of wages, but the reverse. The tenor of the article is to the effect that the strike in London, of workmen in the building trades, is eminently suggestive of the necessity for some elementary instruction in political economy; and to show how such instruction might be given on the plan adopted in the "Birkbeck" schools, established (with the exception of that of the London Mechanics' Institution) at the expense of Mr. Wm. Ellis, who has been selected by the Queen to instruct her own children in similar subjects. Recollecting "The Results of Machinery," the article is not all that we ourselves should have desired from Mr. Knight. It leaves unsolved some points in the present stage of the capital and labour question that must occasion difficulty with many readers: it may be sufficient to refer to the fact that, whilst Mr. Knight writes that principles if understood "would show that strikes *must* fail," Lord St. Leonards began his late letter by an admission that strikes "may at times become expedient;" and that what the working man wants just now, is an explanation of such seeming contrariety of opinion and advice. The following portion of the article may be usefully quoted:—

"We have termed the builders' strike the most remarkable manifestation of ignorance of economical laws that was ever exhibited by skilled workmen. The organizers of this strike have proclaimed what their Trades' Union has resolved upon as elementary truths:—

1. If, as the political economists maintain, the rate of wages depends upon the proportion of the number of workmen competing for employment to the amount of capital out of which wages are to be paid, a general resolution to work only nine hours instead of ten, the daily wages remaining the same, will produce the same effect as if one-tenth of the aggregate number of workmen were withdrawn from the competition for wages.

2. To carry forward the same principle to the same result, it is necessary that the workman should not do as much work as he can, but as little as he can; that to counteract the abundance of labour its efficiency should be lessened; that the bricklayer should never put his trowel out of his hand to lift anything requiring two hands; that to break down the distinction between the industrious and the lazy workman, the skilful and the unhandy, there should be no piecework and no overtime; and that to mark the line of demarcation between employer and employed, and to prevent any stimulus to industry under the master's eye, the man is never to work by the side of his master.

3. That machinery has diminished the amount of human labour required to produce a certain quantity of work; and that the saving in the cost of production ought therefore to be for the benefit of the labourers, and not for the consumers of the thing produced.

It is always difficult to overrate the aggregate folly of a class, whether an upper or a lower class, when it is bent upon accomplishing some object by coercion, and resorts to what it terms argument for its defence. The protectionist class, that used to coerce society by legislation, has come to an end; its enactments are no longer binding, its rhetoric is no longer heard. The trades' union class is rampant in its power of coercion over other workmen, and its rhetoric is unimpaired by sorrow and defeat. The wives and children of builders out of employment are dying around them, suicide suggests itself to the unhappy husband and father, and yet the leaders of the "society men" cry out to persevere. For what? To maintain the doctrines which we have set forth above,—fallacies which a child in a Birkbeck school will reject as assuredly as the most enlightened teacher of those great natural laws of Industry, a knowledge of which would save many unhappy men from misery and ruin."

The other articles in the first part of the "Companion," are,—"The Patent Office, and Patent Museum," by George Dodd, detailing the extension made since the date of our notice, which first directed attention of architects to the subject; but also showing the lamentable restrictions of space which cramp Mr. Woodcroft's exertions;—"The Naval Force of the United Kingdom;"—"The National Collection of Sculpture" (a clearly written and succinct account), by James Thorne; "A History of Comets," by J. R. Hind, in continuation of a former portion; "The War in Italy, and its Antecedents;" and "The Wreck Chart, and the National Life Boat Institution;" besides the tables relating to the Funds, and Rate of Interest at the Bank, and the Average Prices of Corn.

The article on Architecture comprises twenty-nine pages, besides a lengthy rejoinder to some remarks at the Royal Institution, by Mr. Denison, upon the last year's article in the "Companion,"—wherein its writer had referred to a private arrangement for rebuilding the Doncaster Church tower in a different character of architecture, as though the arrangement had not been fair to the subscribers,—now showing that he based his remarks upon Mr. Denison's words in a letter in our last year's volume respecting the Taunton tower. The general article contains a considerable number of items of information as to the works in progress during the year, and some judicious opinions; and is improved in character in most points. We must, however, except the illustrations, which are, several of them, bad as those of last year, and therefore prejudicial to any object. There are some errors; and we may also say, we notice (though we are aware we are here not in agreement with the writer) a rather free use of what has appeared in our columns; and that the time has really arrived when the article on Architecture, in an organ of so much importance as the "Companion to the Almanac," should be made to present something more than what it has too much become, a catalogue of the names of buildings, rather than an annual review of the state of the subject whereof it treats.

We are sorry to be obliged to revert to inaccurate information given in the "British Almanac"—or first part of the volume. That Sir George Grey, having been recalled from the Cape of Good Hope, is again governor, we are aware, though we suspect the compiler is right *by accident*; but certain we are, that Professor Donaldson is not, as last year, Dean of the Faculty of Arts, &c., at the London University, and that the officers of the Institute of British Architects are not as the names are set down. There appears to be an increasing tendency for errors of this character to remain stereotyped in year-books,—which goes to destroy all their value for the object of their publication. Our contemporaries fail to notice them,—so that works which have acquired reputation, abuse it by holding the ground against other works prepared perhaps with greater care or conscientiousness. We must not ourselves imitate this abandonment of duties by our contemporaries,—even though our plain-speaking should come forth on the occasion of noticing a work still in many respects so excellent as the "British Almanac and Companion."

Childe Harold's Pilgrimage. By Lord Byron. Cheap Editions. London: Murray. 1860.

The way to prevent the servants from going to the table-beer barrel is to put a cask of ale by the side of it. The way for owners of copyright to prevent infringements is themselves to issue editions at a price that cannot be competed with; and this Mr. Murray is doing. Here we have a shilling edition and a sixpenny edition of Byron's exquisite poem, with the notes, and in the first case, illustrations. These books will provide for Childe Harold (the architect's poem *par excellence*) a new and enlarged public.

Sussex Archæological Collection, relating to the History and Antiquities of the County. Published by the Sussex Archæological Society. Vol. XI. London: John Russell Smith, Soho-square.

The new volume issued by the Sussex Archæological Society contains some interesting contributions to the history of the county, the point properly aimed at, particularly an account of Paxhill and its neighbourhood, by Mr. Blencowe, with views of the house and of others at Lindfield, Holmesdale, and Chaloner; the defence of Sussex from invasion in 1596, by Mr. Blaauw; and extracts from the "Diary of a Sussex Tradesman" a hundred years ago, by Mr. Blencowe and Mr. M. A. Lower. The account of Pynham Priory, by the Rev. Edward Turner, with a very clever little woodcut, should also be mentioned. The Society appears to be weakest in respect of architectural writers; descriptions and elucidation of the many interesting structures in Sussex, when given, often displaying less of the knowledge and force to be found in other departments of the journal than is desirable.

Examples of Modern Alphabets, Plain and Ornamental. Collected and engraved by F. Delamotte. London: Spon, Bucklersbury, 1859.

This collection of alphabets in modern use, including Riband, Rustic, Old English, &c., is intended by Mr. Delamotte for the service of draughtsmen, surveyors, masons, decorators, and others, and will be found useful.

Miscellanea.

Death of the Chief Commissioner of Works.—We regret to have to record the death of the Right Hon. H. Fitzroy, First Commissioner of Works, which melancholy event took place on Saturday last at Brighton. Deceased was son of the second Baron Southampton, by his second wife, second daughter of Lord Robert Seymour, and was heir presumptive to the Barony of Southampton. He was born in London, in 1807.

The Roman Villa at Carisbrook.—A flight of stone steps, leading under the bath, has been discovered at the Roman villa at Carisbrook, in the Isle of Wight. They are supposed to lead to the flue under the floor of the hypocaust, says the *Hampshire Advertiser*, and may probably be in communication with a furnace. The villa, after all, is not to be roofed. It is proposed to place two slates on the top of the chalk walls, and a quantity of shore-sand at the base, for the avowed purpose of preservation. The work has been carried on under the direction of Mr. Millins. A gentleman has promised to contribute 400*l.* for the ruins to be properly put under cover.

Metropolitan Board of Works.—At the last ordinary weekly meeting of this Board tenders for the general works in the western division north of the Thames were considered, and the tender of Mr. Thirsk, being the lowest, was accepted. It appeared, however, that it exceeded by two per cent. the estimate made by the engineers of the Board. Mr. Leslie objected to the public paying two per cent. more than their own engineers had decided was a fair price to be paid for the works. A long discussion ensued, after which the following resolution was carried by a majority of sixteen to twelve:—"That, when this Board shall apply to Parliament for further amendment of the Metropolis Local Management Act, a clause shall be introduced to empower the Board to assess the different sections of the metropolis for payments on behalf of the Board in such amounts as it may deem equitable, without being obliged to follow the basis of the county rate or rates; and that it be referred to the main drainage committee to report in which way it would be best carried out."

The Loch Katrine Water Scheme.—In addition to the first sum of 700,000*l.* which was deemed amply sufficient for the completion of the new Glasgow Water Works, including the purchase of the old stock, &c., the commissioners in Glasgow, who have charge of these works, says the local *Gazette*, found it necessary, last year, to go to Parliament for a further supply of 200,000*l.* This was also deemed to be amply sufficient to finish the works. But this year we have another application, adopted by the commissioners at their meeting on Thursday, for a further sum of 350,000*l.* sterling, and it is not stated now that even this will be sufficient. The water was promised to be introduced to the city some weeks ago. It is very much wanted.

Royal Charter.—In respect of the destruction of the *Royal Charter* and other vessels on a lee shore, it has struck me very forcibly that an available means of safety is possible in many, if not in all, these disastrous cases. To be lost on a lee shore implies that the wind blows from the sea to the shore. Now what in effect would be easier than to construct an extempore kite, by means of a couple of sticks, arranged like the letter X, and to stretch on these a napkin, a silk handkerchief, or a fragment of sail? what boys term a bellyband is then to be attached, a tail also to steady the light machine, and a cord—and it is complete. An hour elapsed from the time the *Royal Charter* struck till the ship parted; but during that hour extempore kites might have secured safe and certain communications, one or more, with the shore, and the lives of hundreds—for the interval was not a stone's throw—might have been saved.—Henry M'Cormac, M.D.